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CURRENT AND PROSPECTIVE MARKETS FOR PLYWOOD IN THE DENVER TRADE AREA

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and
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ECONOMICS

September 15, 1970

Mr. Harold E. Worth, Project Leader
Forest Products Marketing Research
Rocky Mountain Forest and Range
Experiment Station
240 West Prospect
Fort Collins, Colorado 80521

Dear Mr. Worth:

Submitted herewith is the latter of two final reports to meet the University contractual obligations under U.S. Department of Agriculture, Forest Service Order No. 822-RM-68 dated June 31, 1968, as amended by Order No. 822-RM-68 (sub 1) dated August 8, 1969. This second report includes the results from all three phases of the Denver Trade Area plywood marketing project.

Sincerely,

K. C. Nobe

Kenneth C. Nobe
Chairman

KCN:pk

ACKNOWLEDGEMENT

Appreciation is expressed to Harold E. Worth, Forest Products Marketing Research Project Leader, Rocky Mountain Forest and Range Experiment Station for his assistance in overcoming the many unexpected obstacles faced during the study.

We also thank the graduate students, work study students and secretaries in the Department of Economics, Colorado State University who assisted with this project.

A special appreciation is offered to the many people throughout the study area who responded to questionnaires and telephone and personal interviews. Without their cooperation the completion of this project would not have been possible.

CONTENTS

INTRODUCTION	1
Population Derivation	3
Detailed Interview Methodology	7
DISTRIBUTION OF PLYWOOD BY WHOLESALE AND RETAIL LUMBER DEALERS	10a
Amount of Softwood Plywood Handled	10a
Amount of Hardwood Plywood Handled	12
Sources of Softwood Plywood Handled	14
Sources of Hardwood Plywood Handled	15
Locational Characteristics of Plywood Purchases	16
Disposal of Plywood	17
Market Groups To Whom Plywood Was Sold Within The Study Area	18
Importance of Plywood in Distributor Purchases and Sales	20
PLYWOOD USED IN CONSTRUCTION	20
PLYWOOD USAGE IN SINGLE FAMILY HOUSING CONSTRUCTION	22
Plywood Sources	23
Plywood Applications	24
Amounts of Plywood Used in New Construction and Remodeling	25
Plywood Market Shares	26
Size of Single Family Home Builders	26
PLYWOOD USAGE IN MULTI-FAMILY HOUSING CONSTRUCTION	27
Plywood Sources	28
Plywood Applications	28
Plywood Used in New Construction and Remodeling	29
Market Share Held By Different Materials in Different Applications	30
Size of Apartment Building Firms	30
PLYWOOD USAGE IN NON-RESIDENTIAL CONSTRUCTION	31
Plywood Sources	32
Plywood Application	33
Amounts of Plywood Used in New Construction and Remodeling	34
Market Share of Plywood	34
Size of Firms	35

PLYWOOD USED BY MANUFACTURERS 35
Amounts of Plywood Used in Manufacturing 36
Sources of Plywood Used by Manufacturers 37
Species of Plywood Used and Substitute Materials 38

REASONS FOR USING DIFFERENT MATERIALS IN BUILDING CONSTRUCTION 41
Procedures 41
End Uses for Materials 44
Roof Sheathing 45
Sub-flooring and Underlayment 45
Paneling 46
Form Work 47
Other Plywood Uses 47

SUBSTITUTES AND FACTORS THAT INFLUENCE THE CHOICE OF MATERIALS 48
Roof Sheathing 48
Sub-flooring and Underlayment 49
Paneling 50
Form Work 50
Other Uses 51

FACTORS INFLUENCING THE CHOICE OF MATERIALS 52
Highways and Bridges 52
Commercial, Multiple Family and Public Buildings 52
Single Family Homes 56
Lumber Yards 58
Prefab and Modular Manufacturing 58

NEW PRODUCTS AND CHANGES IN USE OF CONSTRUCTION MATERIALS 58
Bridges 58
Factories and Warehouses 59
Commercial, Public, and High-rise Apartment Buildings 60
Mobile Homes and Travel Trailers, Prefabricated and Modular Components 62
Single Family Homes 63
General Attitudes Toward Wood Products 64

THE FUTURE FOR PLYWOOD AS A BUILDING MATERIAL 67

APPENDIX I. SUMMARY TABLES

Table 1. Response to initial classification questionnaire, Denver trade area, 1969

Table 2. Response to follow-up classification questionnaire, Denver trade area, 1969

Table 3. Summation of responses to classification questionnaires

Table 4. Number and percent of telephone interviews completed with distributors of plywood, Denver trade area, 1969

Table 5. Percentage shares and amounts of softwood plywood purchased by wholesale and retail dealers, Denver trade area, 1969

Table 6. Percentage shares and amounts of hardwood plywood purchased by wholesale and retail dealers, Denver trade area, 1969

Table 7. Sources of softwood plywood handled by wholesale and retail dealers, Denver trade area, 1969. (Figures in thousands of square feet, 3/8 inch basis.)

Table 8. Sources of hardwood plywood handled by wholesale and retail dealers, Denver trade area, 1969. (Figures in thousands of square feet, 3/8 inch basis.)

Table 9. Plywood purchases classified by location, Denver trade area, 1969

Table 10. Disposal of softwood plywood by wholesale and retail dealers, Denver trade area, 1969

Table 11. Disposal of hardwood plywood by wholesale and retail dealers, Denver trade area, 1969

Table 12. Market groups to whom softwood plywood was sold in the Denver trade area, 1969

Table 13. Market groups to whom hardwood plywood was sold in the Denver trade area, 1969

Table 14. Average proportion of building materials value represented by plywood in purchases and sales of DISTRIBUTORS, by location, Denver trade area, 1969

Table 15. Sample for completion of detailed questionnaires by telephone interviews by location and type of construction, Denver trade area, 1969

Table 16. Amount of plywood used by type of construction, Denver trade area, 1969

Table 17. Softwood plywood used in single family housing construction by location and thickness, Denver trade area, 1969

Table 18. Hardwood plywood used in single family housing construction by location and thickness, Denver trade area, 1969

Table 19. Sources of plywood used in single-family housing construction, Denver trade area, 1969.

Table 20. Sources of plywood by type of construction, Denver trade area, 1969

Table 21. Softwood plywood applications in single family housing construction, Denver trade area, 1969

Table 22. Hardwood plywood applications in single family housing construction, Denver trade area, 1969

Table 23. Amounts and percentages of plywood used for new construction and remodeling in single family housing construction, Denver trade area, 1969

Table 24. Average market share held by plywood and competing products for selected uses in SINGLE FAMILY HOMES, Denver trade area, 1969

Table 25. Average number of houses completed and value of sales for SINGLE FAMILY HOME BUILDERS, by location, Denver trade area, 1969

Table 26. Softwood plywood used in multi-family housing construction by location and thickness, Denver trade area, 1969

Table 27. Hardwood plywood used in multi-family housing construction by location and thickness, Denver trade area, 1969

Table 28. Sources of plywood used in multi-family housing construction, Denver trade area, 1969

Table 29. Softwood plywood applications in multi-family housing construction, Denver trade area, 1969

Table 30. Hardwood plywood applications in multi-family housing construction, Denver trade area, 1969

Table 31. Amounts and percentages of plywood used for new construction and remodeling in multi-family housing construction, Denver trade area, 1969

Table 32. Average market share held by plywood and competing products for selected uses in APARTMENTS, Denver trade area, 1969

Table 33. Average number of APARTMENTS built and value of this construction by location, Denver trade area, 1969

Table 34. Softwood plywood used in non-residential construction by location and thickness, Denver trade area, 1969

Table 35. Hardwood plywood used in non-residential construction by location and thickness, Denver trade area, 1969

Table 36. Sources of plywood used in non-residential construction, Denver trade area, 1969

Table 37. Softwood plywood applications in non-residential construction, Denver trade area, 1969

Table 38. Hardwood plywood applications in non-residential construction, Denver trade area, 1969

Table 39. Amounts and percentages of plywood used for new construction and remodeling in non-residential construction, Denver trade area, 1969

Table 40. Average market share held by plywood and competing products for selected uses in NON-RESIDENTIAL CONSTRUCTION, Denver trade area, 1969

Table 41. Number of construction projects by NON-RESIDENTIAL contractors and value of construction by location, Denver trade area, 1969

Table 42. Number and percent of detailed questionnaires completed with manufacturers using plywood, Denver trade area, 1969

Table 43. Amounts and percentage shares of softwood plywood used in manufacturing, Denver trade area, 1969

Table 44. Amounts and percentage shares of hardwood plywood used in manufacturing, Denver trade area, 1969

Table 45. Purposes for which softwood plywood was used by manufacturers, Denver trade area, 1969

Table 46. Purposes for which hardwood plywood was used by manufacturers, Denver trade area, 1969

Table 47. Sources of softwood plywood used in manufacturing operations, Denver trade area, 1969

Table 48. Sources of hardwood plywood used in manufacturing operations, Denver trade area, 1969

Table 49. Most frequently used species of hardwood plywood by manufacturers, Denver trade area, 1969

APPENDIX II. Questionnaires

CURRENT AND PROSPECTIVE MARKETS FOR PLYWOOD IN THE DENVER TRADE AREA

by

Peter Ashton and A. G. Madsen*

INTRODUCTION

Rapid growth of plywood markets in the last decade has resulted in shortages and heavy competition for timber in the traditional plywood-producing regions. But timber technically suitable for plywood is more available in other parts of the country. This situation has focused attention on the production potentials of new sources, usually involving timber species not previously utilized for plywood.

Efficient utilization of the nation's timber supply is a major concern of the Forest Service - especially as it contributes to improved income for rural people. Much of the untapped timber suitable for plywood is found in rural areas where underemployment persists. Often these areas are favorably located with respect to major plywood markets. It is logical, therefore, to consider plywood production as a possible added source of income for low-income rural areas with timber resources.

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One example of such potential is the Black Hills Region of South Dakota and Wyoming, where the Forest Service is currently helping local groups determine the feasibility of plywood manufacture. The technical suitability of Black Hills timber for plywood has already been proved. If an inventory now in process shows a sufficient amount of the right kind of timber to support a plywood mill, production should be technically feasible in this underdeveloped area. But the existence of a market for the particular kind of plywood the Black Hills could produce still remains a question.

The Four Corners Region of Colorado, New Mexico, Arizona, and Utah is another underdeveloped area with plywood potentials. Here, plywood production has already begun to contribute to local income and to reduce poverty among Indian and Spanish-American minorities. One successful plywood mill is in operation. Opportunities may exist to expand plywood production in this region if additional markets can be found.

The objectives of this study were:

1. To trace the movement of a known quantity of plywood through the marketing system from shipment into the study area (Figure 1), or manufacture in the area, to final use. This

Figure 1. DENVER PLYWOOD MARKET STUDY AREA 2a

INSTRUCTIONS

Plywood to report

Report only for the establishment shown in the address. (If there is more than one establishment in your firm, each will be asked to report separately.)

Include only the amounts of plywood used by you or your employees in the Study Area. (Refer to map above for Study Area boundaries.)

Do not report plywood used by subcontractors who worked for you, plywood used in manufactured components you bought, or plywood used outside the Study Area.

Plywood volume

Reporting plywood volumes in square feet of surface area is preferable, but provision is made to report number of sheets.

If sheets are the unit used, please give the length and width in feet; for example, 4 x 8, 4 x 9, 3 x 6, etc. To convert number of sheets to square feet, multiply the surface area by the number of sheets. Example: A 4 x 8 sheet has 32 square feet of surface area; therefore, ten 4 x 8 sheets (32 square feet) = 320 square feet of plywood.

Softwood and hardwood classification

The species of the face veneer determines the classification of the plywood. (For example, if the face veneer is a hardwood, classify the plywood as "hardwood plywood" regardless of what species is used for the back veneer or inner plies.)

Classify plywood as "softwood" if it is faced with a "medium density," "high density," or non wood-grain pattern "high pressure" overlay.

Classify the plywood according to the species represented by the overlay if it is faced with a wood-grain printed overlay.

includes identification of the amounts and kinds of plywood handled by each level of the distribution chain.

2. To determine the amounts and kinds of plywood used in each of the various classes of users and to learn the specific end uses they made of it.

3. To determine the share of the market plywood commands in each type of application.

4. To determine the principal products that compete with plywood in each end use.

The final phase of the study investigates reasons why users select plywood for certain applications. Also the relationships between actual use requirements and current plywood specifications are explored.

The tables have been placed at the end of the written descriptive material in order to facilitate reading the text. Readers interested in the more detailed data can refer to Appendix I.

Population Derivation

The first step in this phase of the study was to derive a complete listing of all potential plywood users and distributors located in the Denver trade area. For this purpose, the

primary source of names was the telephone directory of each population center within the study area. Reference was made to the following headings in the yellow pages and all the listed firm names were included on a list of potential plywood users.

Nature of Business	Yellow Pages Heading
Distributors of Plywood	Lumber - Retail Lumber - Wholesale Plywoods and Veneers - Retail Plywoods and Veneers - Wholesale
Building & Construction Companies	Building Contractors General Contractors Home Builders Home Improvements
Manufacturing Establishments	Boxes - Wood Buildings - Precut and Prefabricated Cabinet Makers Cabinets Campers and Pick-up Coaches - Manufacturers Carpenters Doors Kitchen Cabinets Millwork Mobile Homes - Manufacturers Packaging and Crating Service Partitions Roof Structures Store Fixtures and Fronts Woodworkers

Reference was also made to Dun's reference book, Lumber and Wood Products Industries, 1968 and to two State of Colorado

manufacturing directories[1] but it was found that these sources simply duplicated the more comprehensive telephone directory listings.

Because of a turnover in personnel working on the project and subsequent loss of records pertaining to the "original mailing list," it was necessary to develop a "new mailing list." This time delay also delayed data collection until the period January - May, 1970; therefore, 1969 data were obtained rather than 1968 information as originally planned.

The list containing 3,162 names was tentatively partitioned into nine locational categories and three broad "nature of business" groups (distributors of plywood, users in building and construction activities, or users in manufacturing operation). This "new list" was strictly an initial accounting of all firms who, based on their classification in the yellow pages of the telephone directory, might subjectively be considered as users or distributors of plywood.

In order to establish a population of actual plywood users or distributors in the Denver trade area, most if not all of the firms on the "original list" were mailed a brief classification questionnaire. This first mailing requested

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[1]These directories were: Directory of Colorado Manufacturers, 1968-69 and Colorado Forest Products Directory, 1969.

data on the specific kind of operation in which the firm was engaged, approximately how much plywood was used (if any) and in what major applications. This amount of information was requested on the premise that questionnaires involving more detailed information relating to the different types of plywood users or distributors would subsequently be mailed. There were 672 responses to the original mailing, 83 percent of whom used plywood in their operations (Table 1). The exact percentage response could not be ascertained because of the lost mailing list (only the respondents were tabulated in Table 1) but it was evident that the return was low in relation to the number of firms on the "new list." Due to the poor response, a follow-up mail questionnaire was sent to the non-respondents (based on the "new list") simply requesting firms to indicate whether or not they used plywood and, if so, how much. This more limited information was requested because the decision was made to obtain the more detailed data by telephone rather than by mail questionnaire.

A 37 percent response[2] was obtained on this second mailing, 80 percent of whom were either plywood users or distributors (Table 2). Table 3 combines the results of the two

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[2]This figure for percent response is based on the total number of questionnaires mailed adjusted for those returned by the Post Office as undeliverable due to faulty or insufficient addresses. There were 96 such returned questionnaires.

mailings to show an overall response of almost 51 percent. Only 268 firms signified that they did not use plywood in any aspect of their operations and were therefore falsely included on the original, subjective list of potential plywood users.

The "new" population list was then modified in light of these results by subtracting the non-plywood-using firms to yield a total of 2,894 firms who were either non-respondents or were users of plywood.

Using the heading in the yellow pages of the telephone directories as a basis for classification, it was determined that the population of plywood users in the Denver trade area consisted of 1,984 establishments engaged in building and construction activities, 482 distributors of plywood and 428 firms using plywood in manufacturing operations.

Detailed Interview Methodology

It was originally intended that in phase two of the study each firm in the plywood-using population would be contacted by mail requesting completion of a detailed questionnaire. Such questionnaires were designed specifically for the type of construction in which the firm was engaged whether primarily single family housing, apartment or non-residential construction, and also for those firms using plywood in their

manufacturing operations and firms that were distributors of plywood. However, in view of the low response to the simple classification questionnaires and the premise that the detailed questionnaire response would be considerably lower still, it was decided that contact should be made with as many firms as possible by telephone. (Complications associated with the "original mailing list" and pressures of time were also factors which entered into this decision.)

Problems arising from this type of approach to data collection were primarily ones of obtaining accurate enough estimates of such things as total amounts of plywood used in 1969 and the percentages of each of the various thicknesses. However, it was usually possible to speak with an individual who was well versed in the size and nature of his operations. Such an individual could either provide estimates readily and with confidence or, alternatively, answers could be derived by discussing each thickness in turn or talking in terms of four by eight foot sheets per month rather than square feet per year.

The overwhelming advantage of conducting the interview by telephone was to insure at least some representation in each use-category and each location within the study area.

Furthermore, any additional comments arising from the telephone discussion could be noted directly onto the questionnaire forms. Such comments often provided valuable insights of an incidental nature that would not have been obtained had contact been made more formally and impersonally through the mail. Generally speaking the firms contacted to answer questions on the detailed questionnaires were those firms that had responded to one of the preliminary classification questionnaires. Those firms that indicated they used less than a total of 5,000 square feet of plywood (both softwood and hardwood, all thicknesses combined) were not contacted. In order to obtain a minimum coverage of at least 10 percent of all plywood-using firms[3] in each location, it was necessary to attempt to contact practically every firm of significant size that responded to the classification questionnaires. In some areas firms that had not responded to mailed questionnaires were contacted.

A surprisingly high level of cooperation was received from interviewees; very few individuals adamantly refused to disclose any information. Many firms appeared to be genuinely interested, particularly when it was explained how the study

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[3]Considerable higher percentage levels of coverage were obtained for distributors of plywood and firms using plywood in their manufacturing operations.

could benefit them as individuals, and many individuals proffered interesting additional information beyond that requested of them. The rapport achieved with those interviewed and the "good will" established for the Forest Service and Colorado State University was in itself valid justification for the telephone interview approach employed.

DISTRIBUTION OF PLYWOOD BY WHOLESALE AND RETAIL LUMBER DEALERS

There were 482 firms that distributed plywood either on a wholesale or retail basis in the Denver trade area. The geographic location of these firms and the number of detailed telephone interviews completed is shown in Table 4. Information regarding total amounts of plywood purchased and sold, from where it was purchased and to what types of customers it was sold was obtained from each of the 98 respondent firms (20.5 percent of the total population of plywood distributors). Since a thickness breakdown was requested in each case, it was a simply matter to convert all of the figures to the standard 3/8 inch basis.

Amount of Softwood Plywood Handled

The 98 wholesale and retail lumber distributors interviewed handled a total of 89,717,000 square feet (3/8 inch basis) of softwood plywood during 1969. In order to derive estimates of total inshipments of plywood to the Denver trade area, those amounts of softwood plywood purchased from sources outside of the study area by firms using plywood in their manufacturing or construction activities must be added to this total. Figures representing these latter amounts were

obtained through interviews with manufacturing firms and construction companies and resulted in additional amounts of 539,000 and 391,000 square feet respectively. Since some distributors located within the study area purchase a part of their plywood from other distributors also located in the study area, a portion of the totals reported was double counted. However, information obtained with respect to the principal customers to whom plywood was sold showed that only 4,884,000 square feet of softwood plywood moved between dealers in this fashion. This amount was subtracted leaving the net inshipment amount of 85,763,000 square feet (3/8 inch basis) accounted for. This represented 51 percent of the 170 million square feet estimated from the American Plywood Association Publication[4] as inshipments to the Denver trade area in 1969.

Table 5 illustrates how the reported amount of softwood plywood was broken down by distributor size class and plywood thickness. The 16 largest dealers (16.4 percent of those interviewed), purchasing more than one million square feet of plywood in 1969, accounted for 62.8 percent of the total

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[4]These estimates are based on 1968 data contained in the American Plywood Association publication by David B. Felch, Regional Production and Distribution Patterns of the Softwood Plywood Industry, November 1969. Patterns similar to 1968 were assumed to prevail for 1969 on a somewhat lower production base.

amount handled. There were 36 dealers (36.7 percent of those interviewed) purchasing between 250,000 and one million square feet and these accounted for 30.9 percent of the total. The remaining 46 firms (46.9 percent of those interviewed) purchased less than 250,000 square feet of plywood and accounted for only 6.3 percent of the total.

In each size class, distributors bought much larger amounts of 1/2 inch plywood than any other thickness. In fact, 51.4 percent of the total amount of softwood plywood handled was 1/2 inch thickness. Approximately equal amounts of the other major thicknesses were handled by each of the distributor size classes.

Amount of Hardwood Plywood Handled

The total amount of hardwood plywood handled by the 98 responding firms was 9,149,000 square feet (3/8 inch basis). As was the case with softwood plywood, those amounts used by manufacturers and construction companies but purchased from sources outside the study area had to be added to this figure and the amounts sold to other distributors also within the study area were subtracted. The additions amounted to 3,848,000 square feet by manufacturers and 21,000 square feet by construction

companies. Only 693,000 square feet were sold to other dealers; therefore, the net amount of hardwood accounted for in this study was 12,325,000 square feet (3/8 inch basis). Hardwood inshipment data are not collected as is the case for softwood.

With respect to hardwood plywood handled, a slightly different pattern of concentration is apparent (Table 6) than was evident for softwood users and handlers. In this case, the 36 medium-sized distributors handled the largest proportion of the hardwood plywood reported and the smallest dealers accounted for a considerably larger proportion of the hardwood plywood than was the case for softwood plywood. This is probably due to the fact that hardwood plywood is purchased in much smaller quantities and more often.

Table 6 further illustrates the large quantities of prefinished hardwood plywood paneling that is distributed relative to the other thicknesses. This prefinished paneling is of 1/8, 3/16, or 4mm in thickness and was only included in this study if it was primarily a hardwood plywood product (i.e. fabricated from hardwood laminates). The two other hardwood plywood thicknesses most widely handled were 1/4 and 3/4 inch.

The same classification of distributor size classes was used for hardwood plywood as for softwood plywood dealers.

In other words, a distributor was classified according to the total amounts of softwood plywood he handled rather than by the amounts of both softwood and hardwood plywood combined.

Sources of Softwood Plywood Handled

Most of the very large plywood-producing companies such as Georgia Pacific Corporation and Weyerhauser Company maintain stocks of both softwood and hardwood plywood at their yards in Denver. Large amounts of this plywood are purchased by other retail and wholesale lumber yards for redistribution. This observation explains why such a large proportion of the softwood plywood distributed in the study area was purchased by the distributors from wholesale dealers also located within the study area (Table 7).

Considerable amounts were purchased through brokers, jobbers and mill agents who maintained offices in Denver and these quantities were also included in the "wholesale dealers in the study area" source category. The other major source of softwood plywood was directly from mills located outside the study area, usually on the West Coast.

Lesser amounts of softwood plywood were purchased from other dealers located outside the study area and from the one

plywood-producing mill in the study area. Only the medium-sized and smallest distributors reported that they obtained a part of their softwood plywood from this mill. This seems to indicate that a large market is untapped by the local mill since the large distributors handle most plywood.

Sources of Hardwood Plywood Handled

As was the pattern with regard to softwood plywood sources, most hardwood plywood (42.2 percent of the total reported) was obtained from other dealers located within the study area and these dealers were, again, the few large plywood-producing companies. An additional 33.0 percent of the reported total came from mills outside the study area and 16.4 percent was purchased from other dealers located outside the study area (Table 8).

The largest dealers, purchasing more than one million square feet of softwood plywood, obtained most of their hardwood plywood either from the large, wholesale distributors or directly from mills outside the study area. The medium-sized dealers obtained most of their hardwood plywood in a similar fashion but two of them also purchased a significant amount from importers located on the West Coast. Presumably, these would be special orders that could not be obtained from

the more commonly used sources. One of the smallest distributors also purchased a large amount of hardwood plywood from an importer but, in this case, it was all unusual, prefinished panelling. Otherwise, the smallest distributors obtained most of their hardwood plywood from the large, local wholesalers as did the other two distributor size classes.

Locational Characteristics of Plywood Purchases

Table 9 shows that plywood distributors located in the Denver metropolitan area accounted for 50 percent of softwood plywood purchases for distribution and over 56 percent of the corresponding hardwood purchases. Much of this plywood would be used by manufacturing or building and construction operation within the Denver metropolitan area but most of these large, Denver-based distributors have well established delivery systems to outlying parts of Colorado and even to Wyoming. Hence, significant proportions of the plywood reported by the Denver distributors were not necessarily consumed in the immediate Denver area. These figures do, however, point to Denver as the focal point of plywood distribution within the study area and thus should be closely evaluated by firms contemplating building new mills to utilize forest resources in the area.

Substantial amounts of plywood were also handled by the other major population centers, particularly Albuquerque which acts as the main distribution point for much of New Mexico.

Disposal of Plywood

Table 10 and 11 show the amounts of softwood and hardwood plywood respectively that were actually sold to other users and thus distributed within the study area. No distributor interviewed reported that he sold any plywood to users located outside the study area which meant that the total inshipments of both softwood and hardwood plywood discussed above were entirely either distributed to other users within the study area or else were used by the distributors themselves also within the Denver trade area. None of these inshipments left the study area at this stage. The amounts used by dealers internally and not sold are also shown in Table 10 and 11.

Of the total amount of softwood plywood sold to others, 62.8 percent was accounted for by the largest dealers. Only 1.5 percent of all the softwood plywood reported was used by the distributors themselves in their own operations and then it was used for such purposes as manufacturing millwork items and cabinets, or crates and boxes. This left 98.5 percent,

or a total of 88,359,000 square feet (3/8 inch basis), of softwood plywood that was sold to other users within the study area.

Disposal of hardwood plywood followed a slightly different pattern, the medium-sized dealers selling the largest proportion (43.9 percent) of the reported total while the largest dealers accounted for 40.0 percent. The reason for this difference is probably the fact that hardwood plywood is purchased in smaller amounts and more often by retail customers to whom these smaller dealers tend to cater, as was pointed out previously. Similar to the pattern of softwood plywood disposal, only 0.4 percent of the total reported was used by the distributors themselves meaning that 99.6 percent or 9,113,000 square feet (3/8 inch basis) was sold to others within the study area.

Market Groups To Whom Plywood Was Sold Within The Study Area

A total of 5,183,000 square feet (3/8 inch basis) of softwood plywood was sold by wholesale and retail dealers to building contractors within the Denver trade area. This amount represented 65.8 percent of all the softwood plywood sold by firms contacted making building and construction companies by far the largest market group of plywood consumers.

A significant amount (22.4 percent of the reported total) was sold on a retail basis to do-it-yourself customers. Much smaller amounts went to other distributors, industrial users and farms and ranches (Table 12).

The largest proportion of softwood plywood sales by each of the three distributor size classes also went to building and construction companies. Second in each case were the amounts sold to undefined retail customers (do-it-yourself) but relatively larger proportions of do-it-yourself sales were encountered in the two smaller distributor size classes than in the largest group.

With respect to hardwood plywood market groups, the largest proportion of the reported total (45.5 percent) was sold to the do-it-yourself market while building and construction companies accounted for a lesser 37.2 percent. Once again, small amounts of hardwood plywood were sold to other dealers for redistribution, to industrial users in their manufacturing operations and to farms and ranches (Table 13).

No attempt was made to trace the amounts of plywood sold to do-it-yourself customers to their ultimate applications but representatives of the building and construction market and

the industrial manufacturing users were contacted through similar, in-depth telephone interviews with a view towards obtaining a detailed analysis of plywood usage in these markets. The results of these interviews are discussed in the following sections of this report.

Importance of Plywood in Distributor Purchases and Sales

Plywood is relatively important to building material distributors when viewed as a proportion of the value of all materials sold or purchased. Plywood represented 21 percent, on the average, of the value of all materials purchased by distributors (Table 14). This ranged 35% for firms operating in Albuquerque to 14 percent for firms in Colorado Springs and New Mexico (general). The relative shares were about the same for plywood value as a percent of all material sales.

PLYWOOD USED IN CONSTRUCTION

The total number of firms that used plywood in their construction activities was determined previously (page 7) to be 1,984 establishments. The number of firms in each major location in the study area and the number with whom telephone interviews were conducted is shown in Table 15. For each location, a concerted attempt was made to complete in-depth

interviews with at least ten percent of the total number of plywood using construction companies. This ultimate objective was achieved. However, due to unwillingness or inability of respondents to answer the required questions or by failing to contact a sufficient number of firms due to time and money constraints, the ten percent level was not attained in two locations (see Table 15). This deficiency was compensated for by interviewing more than ten percent of the construction companies in other locations.

Interviews with 198 construction firms were thus completed and these were classified according to the primary nature of their construction activities into one of three categories: 1) single family housing, 2) multi-family housing, or 3) non-residential construction. The use of plywood in each of these three categories will be discussed in turn. In order to avoid either a disproportionate number of tables or an unreasonably complicated format, the data are presented according to location classification.

The 198 construction companies interviewed reported using a total of 29,678,000 square feet of softwood plywood and 3,219,000 of hardwood plywood, both calculated on a 3/8 inch basis. Single family housing construction accounted for 54.7

percent of the softwood plywood and 40.6 percent of the hardwood plywood while non-residential construction accounted for 32.9 percent and 56.5 percent respectively. The balance of the plywood reported was used in multi-family housing construction (Table 16). The greater use of hardwood plywood in non-residential construction is explained by the extensive use of this plywood for interior panelling and fixtures, whereas, in single family housing such applications are not as extensive. Specific applications of both softwood and hardwood plywood is discussed in more detail below.

PLYWOOD USAGE IN SINGLE FAMILY HOUSING CONSTRUCTION

A total of 96 companies primarily engaged in single family housing construction were interviewed. These firms reported using 16,239,000 square feet of softwood plywood (3/8 inch basis), the vast majority of which (62.9 percent) was of 1/2 inch thickness. Lesser amounts of the other major thicknesses were reported (Table 17). Most of these firms were located in the three largest population centers in the study area (metropolitan Denver, Colorado Springs, and Albuquerque) and accounted for over 67 percent of all the softwood plywood used in single family housing construction.

Table 18 illustrates a similar pattern with regard to hardwood plywood usage. The 96 firms used a total of 1,308,000 square feet (3/8 inch basis) of hardwood plywood, more than 59 percent of which was of 1/4 inch thickness. Firms in the three largest population centers accounted for 62.4 percent of all the hardwood plywood used.

Plywood Sources

Most of both softwood and hardwood plywood used in single family housing construction was purchased from retail dealers within the study area. Only 12.3 percent and 12.1 percent of the softwood and hardwood plywood respectively came from wholesale dealers within the study area (Table 19) leaving 1.9 percent of softwood plywood and 1.5 percent of hardwood plywood purchased from either wholesale or retail dealers outside the study area.

Single family housing construction consumed 64.5 percent of the total amount of softwood plywood and 77.3 percent of the hardwood plywood purchased from retail dealers. The largest proportions of both softwood and hardwood plywood purchased from wholesale dealers were used in non-residential construction (Table 20).

Plywood Applications

Approximately 53 percent of the softwood plywood used in single family housing construction was employed as roof sheathing. A considerable amount (35.5 percent) went into subflooring while lesser quantities were used for soffit and floor underlayment. Six other application categories were investigated but usage of softwood plywood in these applications was essentially insignificant. The softwood plywood used in roof sheathing and subflooring was almost entirely of 1/2 inch thickness which explains why this particular thickness was the most extensively used. The soffit and floor underlayment were primarily of 3/8 inch with some 5/8 inch while most of the 3/4 inch plywood was used in cabinets and interior fixtures. Details of the amounts of softwood plywood used in each application are shown in Table 21.

With respect to the hardwood plywood, the most extensive application was wall paneling accounting for 57.4 percent of all the hardwood plywood used in single family housing construction. This paneling was primarily 1/4 inch thick but also included some 1/8 inch and 3/16 inch covered by the "other" thickness category in Table 22. The species employed most extensively were mahogany and birch with some lesser usage of

walnut, oak and maple. A considerable amount (22.4 percent) of hardwood plywood was also used in shelving, fixtures and general cabinet work.

Amounts of Plywood Used in New Construction and Remodeling

Table 23 shows the proportions of softwood and hardwood plywood used in new construction and remodeling of single family houses. A total of 11,161,000 square feet surface measure, or 93.0 percent of the total amount of softwood plywood, was employed in new construction while remodeling only accounted for 839,000 square feet. Colorado Springs, Boulder and Albuquerque show the highest proportions of new construction while the Colorado and New Mexico miscellaneous categories show the highest amounts for remodeling. This might be interpreted as being representative of the rapid growth of new urban construction whereas, in non-urban areas, there is relatively greater emphasis on the remodeling of existing structures.

Compared to softwood, a relatively large amount (35.0 percent) of the hardwood plywood was used in remodeling leaving only 65.0 percent for new construction. This fact may be explained by the observation that most remodeling is

interior work involving relatively more hardwood and does not usually incur modification of the main building structure in which most of the softwood plywood is utilized.

Plywood Market Share

Plywood almost has the corner on the market in terms of material used for roof sheathing for single family houses. Firms contacted for this study indicated that plywood was about the only material used, the exception was the New Mexico (general) area where boards represented 10 percent of the market (Table 24). The second major use for plywood was for subflooring. From 73 percent to 98 percent of material used was plywood depending upon location. Hardboard products were the major competitors in this use. Plywood was also used in other uses but the number of firms willing to identify the relative share represented by different materials for these applications was too few to justify presenting the percentage numbers.

Size of Single Family Home Builders

The contractors participating in the study built an average of 13 houses per contractor in Pueblo to 79 houses per contractor in Colorado Springs. Of the 95 contractors

providing value of sales information, 31 were in the $200,000 to $499,999 category and 20 were in the over $1,000,000 class (Table 25). These 95 firms built 4,329 houses during 1969.

PLYWOOD USAGE IN MULTI-FAMILY HOUSING CONSTRUCTION

Multi-family housing construction represented the fewest number of construction companies in the sample; 20 such interviews were completed. Eight of these firms were located in the Denver metropolitan area and these eight reported using 44.5 percent of the total 3,663,000 square feet (3/8 inch basis) of softwood plywood. The next largest proportion (23.4 percent) was used by three companies in Colorado Springs. No multi-family housing construction companies were included in the sample for Pueblo or New Mexico.

Similar to the pattern observed with respect to single family housing, the most extensively used thickness of softwood plywood in multi-family housing construction was 1/2 inch accounting for 71.4 percent of the total. Five-eighths inch thickness constituted the next largest category with 20.7 percent of the total (Table 26).

Very little hardwood plywood was used in multi-family housing construction (Table 27), only 91,000 square feet (3/8 inch basis) being utilized. More than 67 percent of this was of 1/4 inch thickness, while the remainder was primarily

3/4 inch material.

Plywood Sources

Just as in single family housing construction, most of the softwood plywood (78.3 percent) used in multi-family housing was purchased from retail dealers located within the study area. All the hardwood plywood came from retail dealers similarly located within the study area (Table 28). It is interesting to note that both with respect to single family and multi-family housing construction, the only companies that purchased any plywood from sources other than dealers located within the study area, were some of those firms either in Wyoming or in the Colorado miscellaneous category. These locations represent the periphery of the study area where smaller construction companies tend to be located. Convenient sources of supply for these small companies with their relatively small purchases may be outside of the study area rather than in the major population centers with the Denver Trade Area where the larger firms tend to operate.

Plywood Applications

Subflooring, of 1/2 inch and some 5/8 inch material, was the largest application for softwood plywood in multi-family

housing construction. This use accounted for 46.8 percent of the total reported. More than 34 percent of this type plywood was used in roof sheathing with cabinets, siding and floor underlayment being the only other significant application categories. Details of these applications classified by location are shown in Table 29. The 5/8 inch material not used for subflooring and roof sheathing was used in siding while almost all the 3/4 inch plywood was used for cabinets and shelving.

The two most common applications for hardwood plywood were 3/4 inch in cabinets and 1/4 inch in wall paneling accounting for 52.4 percent and 46.4 percent respectively (Table 30). This distribution is similar to that encountered in single family housing construction.

Plywood Used in New Construction and Remodeling

Most of both the softwood and hardwood plywood used in multi-family housing construction (97.3 percent and 97.6 percent respectively) was employed in new construction (Table 31). These proportions show greater emphasis on new construction in multi-family housing than was encountered in single family housing. Use of plywood in remodeling of existing multi-family houses was very limited since only 74,000 square feet of both

hardwood and softwood plywood combined was reported.

Market Share Held By Different Materials in Different Applications

The number of firms building apartments was few, therefore, information was sketchy regarding the importance of different materials used for different applications. Since fewer than four firms indicated that they used material for a given application in most locations percentages were not shown in most categories. However, the materials being used by at least one firm were identified. For example, plywood and 2" x 6" boards were used for roof sheathing by Boulder builders while Wyoming apartment builders used plywood and some hardboard material (Table 32).

Size of Apartment Building Firms

Denver apartment building firms who participated in the study averaged 39 garden apartments. Colorado Springs builders averaged 318 units. However, it will be noted that the three firms from Colorado Springs all were in the over $1,000,000 class in terms of construction value. Eleven of the 17 firms responding to this questionnaire were in this sales category (Table 33).

PLYWOOD USAGE IN NON-RESIDENTIAL CONSTRUCTION

A total of 82 firms whose primary activity was non-residential construction were interviewed. Most of these firms were located in the major population centers, particularly in Denver and Albuquerque. This is not surprising when it is recognized that they were engaged for the most part in constructing such structures as office, store and bank buildings. The 16 firms located in Albuquerque accounted for the largest proportion of both the softwood (33.5 percent) and hardwood (74.3 percent) plywood utilized in non-residential construction suggesting extensive non-residential development in this city or using larger proportions of plywood materials in the structures. Similarly, Pueblo firms used more softwood plywood in non-residential construction than in single family and multi-family housing compared to other areas. Boulder accounted for large proportions of plywood usage in single family and multiple family construction, but only one construction company sampled built non-residential buildings, and it used essentially insignificant amounts of both softwood and hardwood plywood. These observations illustrate the characteristic types of construction, hence development and expansion, found in some of the locations considered.

A difference was apparent in the thickness of softwood plywood used in non-residential construction compared to the other two types of construction discussed. Greater thicknesses were used more extensively as evidenced by 44.2 percent of the material in the 3/4 inch category (Table 34). Some one inch and 1-1/8 inch thicknesses were used, and these thicknesses were never mentioned by the other types of construction companies.

More hardwood plywood was used in non-residential construction than in either single or multi-family housing. Once again, this observation is explained by considering the nature of the construction projects. Extensive use of hardwood plywood is made in office, bank and store interiors. The actual proportions of each thickness, however, were similar to the other types of construction, most being 3/4 and 1/4 inch (Table 35).

Plywood Sources

Firms engaged primarily in non-residential construction purchased most (62.9 percent) of their softwood plywood from retail dealers located within the study area (Table 36) which is similar to other types of builders. A few firms located

on the periphery of the study area, such as outlying parts of Colorado and Wyoming, and one firm in Denver, purchased small amounts of plywood from dealers located outside the study area.

With respect to hardwood plywood, however, the pattern is different; most (78.4 percent) of this plywood was purchased from wholesale dealers within the study area. There is no apparent explanation for this difference except perhaps the observation that non-residential construction companies tend to use more hardwood plywood than the other two types of contractors and wholesale rather than retail dealers tend to cater to these larger orders.

Plywood Application

The most noticeable characteristic with regard to the applications in which softwood plywood was utilized in non-residential construction was the fact that concrete formwork replaced roof sheathing and subflooring as the major type of application, accounting for 40.7 percent of all the softwood plywood. This observation also explains why the heavy thicknesses of plywood were so extensively used in non-residential construction since plywood forms were made primarily from 3/4 inch or thicker plywood. Roof sheathing and subflooring were

still major applications for softwood plywood accounting for 27.5 percent and 16.1 percent respectively (Table 37).

Details of hardwood plywood applications in non-residential construction are shown in Table 38. These show no significant departure from the results discussed in regard to the other two types of construction. Cabinets and interior fixtures, made primarily from 3/4 inch hardwood plywood, accounted for 71.6 percent while 1/4 or 3/16 inch wall paneling accounted for 24.5 percent of the hardwood plywood. Relatively insignificant amounts were used in the other applications considered.

Amounts of Plywood Used in New Construction and Remodeling

Table 39 shows the proportions of softwood and hardwood plywood used in new construction and remodeling of non-residential structures. More than 91 percent of all the softwood and 93 percent of the hardwood plywood was utilized in new construction. This pattern is also consistent with those observed previously for other types of construction.

Market Share of Plywood

The firms building non-residential buildings primarily used plywood for roof sheathing. However, board decking represented 26% of the material used for this purpose in New

Mexico. A number of different materials were used as sub-flooring but plywood was still the most important. Plywood was almost the exclusive material used for concrete formwork (Table 40).

Size of Firms

The non-residential contractors were relatively large firms. Thirty-seven of the 75 firms responding to this portion of the questionnaire had construction value of over $1,000,000 and 17 were in the $500,000 to $999,999 category. These firms completed 1,352 building projects and 202 non-building projects during 1969 (Table 41).

PLYWOOD USED BY MANUFACTURERS

As was mentioned in the previous section, some attempt was made to trace the amounts of plywood used by manufacturers to their ultimate applications. According to the original population listing, there were 428 manufacturing establishments considered to be users of plywood in some aspect of their operations. A total of 67 of these firms were interviewed in depth over the telephone so that a 15.7 percent survey was attained. The details of numbers of firms interviewed in each major geographic location within the study area and the corresponding percentages contacted are shown in Table 42.

For purposes of this analysis, manufacturing establishments using plywood were classified according to the type of product that they manufactured. In terms of numbers of firms, the largest group was engaged in manufacturing cabinets, residential or commercial fixtures and interiors, or other general millwork items. Manufacturers of campers and other recreational vehicles constituted the second largest group while furniture, mobile home, and other manufacturers were also treated as separate groups (Table 43).

Amounts of Plywood Used in Manufacturing

The 67 firms that were interviewed reported that they used a total of 5,672,000 square feet (3/8 inch basis) of softwood plywood. The campers and recreational vehicles category used the largest proportion of this plywood (33.1 percent of the reported total) followed by cabinet, fixture and general millwork manufacturers who accounted for 25.6 percent of the total. Almost equal amounts of 1/4 inch and 5/8 inch softwood plywood were consumed, both of these thicknesses accounted for approximately 26 percent of the total (Table 44).

Campers and recreational vehicle manufacturers also used the largest proportion of hardwood plywood accounting for 62.1

percent of the total of 7,924,000 square feet (3/8 inch basis). Lesser, but significant amounts were used by cabinet shops and mobile home manufacturers (Table 43). By far the largest share of all the hardwood plywood consumed was prefinished hardwood paneling used extensively in campers and mobile home manufacturing. These two applications of paneling accounted for 82.5 percent of all the hardwood plywood consumed. The only other thicknesses used to any appreciable extent were 3/4 and 1/4 inch, most being 3/4 inch material used primarily in cabinets, fixtures and general millwork manufacturing.

Tables 45 and 46 show the relative proportions of softwood and hardwood plywood purchased by manufacturers that were used in products made for sale as opposed to the amounts used in products manufactured for their own use. The vast majority of both softwood and hardwood plywood (97.1 percent and 99.6 percent respectively) was employed in products made for sale.

Sources of Plywood Used by Manufacturers

The largest amounts of both softwood and hardwood plywood used by manufacturers were purchased from wholesale dealers located within the study area. About 73.3 percent of the softwood and 50.8 percent of the hardwood plywood consumed came

from this source category. A significant proportion (15.6 percent) of the softwood plywood was purchased from the one plywood-producing mill within the study area and this was all unfinished plywood used by the "other manufacturers" category in such applications as truck trailers and concrete forms. Lesser amounts of softwood plywood were imported directly by manufacturers from wholesale dealers outside the study area or purchased from retail dealers within the study area (Table 47). Most of that purchased on a retail basis was bought by small cabinet shops.

A considerable amount (43.5 percent) of the hardwood plywood consumed was imported directly from mills into the study area by manufacturers, primarily those making campers and other recreational vehicles. Mobile home manufacturers also shipped some hardwood plywood into the study area but in lesser amounts and generally from wholesale dealers outside the study area rather than directly from mills. Very little hardwood plywood was purchased from retail dealers (Table 48).

Species of Plywood Used and Substitute Materials

Practically all the softwood plywood used by manufacturers was Douglas fir with just one firm reporting that it used a small

amount of redwood in its custom cabinet and fixture work. However, a variety of species were encountered in hardwood plywood usage. No actual figures were obtained from which a percentage breakdown by species could be derived but respondents were asked what species of hardwood they most often used. Based on their frequency of response (Table 49), birch plywood was the most commonly used species and this primarily by cabinet and fixture manufacturers. Camper and mobile home manufacturers used luan and mahogany plywood most frequently while furniture manufacturers used birch and mahogany.

It should be pointed out that the species of hardwood plywood used appeared to be highly variable even in specific applications. The controlling influences in choice of species were 1) the availability and hence price of the species in question, 2) consumer tastes, and 3) architectural specifications, the latter two variables being subject to frequent change.

The manufacturers interviewed were also asked to identify those materials other than plywood that were used in the same applications as plywood and to estimate what percentage of all the square foot material used plywood accounted for. Commonly encountered substitute materials for plywood were flakeboard, particleboard, particleboard finished with various hardwood

veneers, and solid lumber together with such trade-name products as "Core-pine," "Cellotex" and "Masonite."

Tremendous variation was apparent in answers to the latter question even between manufacturers engaged in making essentially the same products. In mobile home and camper manufacturing, plywood contributed relatively small proportions to the total square foot material used, large quantities of aluminum and other sheet metal products being employed. Furniture manufacturers also tended to use only relatively small percentages of plywood often preferring particleboard with hardwood veneer finishes or solid lumber. Some cabinet makers, on the other hand, reported using up to 95 percent of the total square foot material being plywood while others preferred particleboard or "Masonite." There were, of course, certain applications in which plywood was universally employed but the data did not support any definitive conclusions. Plywood usage appeared to be very largely a function of individual manufacturers' preferences and the manufacturing techniques that they habitually employed.

REASONS FOR USING DIFFERENT MATERIALS IN BUILDING CONSTRUCTION

(In Depth Panel Interviews)

In the third phase of this study the views of industry representatives regarding different materials and the reasons for their selection were obtained by the in depth panel interview method. This approach allowed panel participants to exchange ideas and discuss problems from their different points of view. Many of the issues raised would not have been introduced in a highly structured two-person interview. Other advantages claimed for the group interview method are:

(1) The base of communications is broadened since the interaction between individuals causes more ideas to be shared, discussed, and evaluated than in a two-person interview.

(2) People lower their communication barriers and are willing to discuss problems in a frank manner more readily than with an interviewer and a respondent.

(3) The individual is more likely to respond in line with his normal behavior because of social inhibitions of the group.

(4) Each individual usually tries hard to contribute information and express views as much as possible.

Procedure

Fifteen panel interview sessions (seminars) were conducted

in different areas of the Denver Trade Area, Figure 1, page 3. In Wyoming the interviews were conducted at Rock Springs, Sheridan, Casper, and Cheyenne; in Colorado interviews were conducted at Greeley, Denver (three groups), Colorado Springs, Pueblo, Cortez, and Grand Junction; in New Mexico two panel groups were interviewed in Albuquerque and one in Santa Fe.

Meeting places were arranged for a noon hour luncheon and then prospective participants were contacted by telephone. From six to nine industry representatives were invited to attend each session. This size group permitted each individual to participate in the discussion of the different topics introduced by the panel moderator or members of the discussion group. Even though final arrangements were made only two or three days in advance of the panel interviews, invariably some last minute complication prevented one or more of those who had agreed to participate from doing so.

An attempt was made to structure the representation on the panels as shown below but this ideal was difficult to achieve because of the non-availability of certain types of industry representatives in the different communities.

Group I (single family home)
- Home builder - large contractor
- Home builder - small contractor
- FHA representative
- Architect or designer
- City building and inspection office representative
- Specialized wholesale - retail plywood distributor (where available)
- General wholesale - retail distributor

Group II (contractors)
- Non-residential contractor
- High rise apartment and office building contractor
- FHA representative
- Architect
- City building and inspection office representative
- Wholesale - retail distributor who deals extensively with this trade

Group III (manufacturers)
- Mobil home manufacturer
- Prefab home manufacturer
- Manufacturers (misc.) - select one or more of a type identified as major plywood users in particular area being studied.
- Materials producer agents in area

A tape recorder was used to record each session so that the moderator could be freed from note taking. Lunch was served during the discussions in order to reduce the time that participants had to be away from their offices. The moderator participated in the discussions only to the extent that the topics he desired to be discussed were introduced

at some point.[5] The topics discussed varied widely, but those encountered most frequently are presented in the findings presented in the remainder of this report. It should be stressed that information presented in this report are the views of the panel participants. They may or may not reflect the views of the Forest Service, U. S. Department of Agriculture, Colorado State University, or the views of the project leader. Some of the statements may be controversial or inaccurate but the information presented is the way that representatives from this cross section view their industry.

End Uses for Materials

In previous sections of this report data were presented to demonstrate the importance of plywood in different uses and materials substituting for plywood in these uses were identified. The void in this information was some explanation about the positive or negative aspects of the materials. The industry representatives were asked to discuss this topic along with other associated topics.

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[5]The advantages and techniques of interviewing are discussed in more detail by several writers. Two such references are: Bingham, Walter VanDyke and Bruce Victor Moore, How To Interview, Fourth Revised Edition, Harper and Row, 1959; Hess, John M., "Group Interviewing," Marketing and The New Science of Planning, 1968 Fall Conference Proceedings, Series No. 28, American Marketing Association. Pp. 193-196.

Roof Sheathing.

In single family homes plywood made with water resistant glue remains the primary material used for roof sheathing throughout the study area. This view is substantiated from data obtained in other phases of this study and similar to findings reported in a national study.[6] Plywood has replaced 1 inch x 8 inch or 1 inch x 12 inch boards because prices are almost equivalent with the added advantage of faster installation time. Two men can cover a roof in about eight hours because the sheets are large size and there is less nailing required; therefore, the total cost is less on a square foot installed basis. There was an indication from the Pueblo, Colorado and Rock Springs, Wyoming panels that there are still builders who use boards for sheathing because they feel it provides a better structure. These builders do not build the lowest priced homes.

Sub-flooring and Underlayment.

Plywood seemed to be the primary material used for sub-flooring for single family homes throughout the Denver trade area. Most of the plywood was 1/2 inch CD grade with interior

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[6]Phelps, Robert B., Wood Products Used in Single Family Houses Inspected by the Federal Housing Administration 1959 and 1962, Statistical Bulletin No. 366, Forest Service, U. S. Department of Agriculture, March 1966. P.8.

glue. The underlayment material was 4/8 inch particle board. There was considerable support for going to 3/4 inch subfloor material to give the strength needed for a long life building.

The CD grade plywood does not seem to be the same quality as in the past. It used to withstand one or two storms without damage but now it warps or delaminates after the first storm if it is not protected. There also seems to be more voids in the material and it is not as strong as it once was.

Paneling.

The use of plywood for paneling was evident throughout the study area in both commercial and high rise construction as well as in single family homes. Some of the retail yards suggested that plywood paneling represents 90 percent of the paneling sales. The change in paneling materials has been very rapid. Until two to three years ago retailers did not carry prefinished paneling, now it is sold every day in numerous types and price ranges. It is used by both do-it-yourselfers and contractors. People are asking for a piece of real wood because they feel that there is a recognizable difference between that and imitation materials. The big mover is stained luan or Philippine mahogany because of its price of around $4.50 a sheet (late fall 1969). Prices then range up to $25 to $30

per sheet and even up to $90 for cherry wood.

Plywood has been found to be the most functional material at present for use as a base for fiberglass laminations used in specialized modular construction. Its light weight, compared to some particleboard materials, and its ability to bond to fiberglass and resins, are the major advantages in this use.

Form Work

Plywood is the primary material used for concrete forms throughout the Denver trade area; however, there are many variations of the forms or forming material.

Plywood produced in the study area was not considered to be adaptable for forming. It does not have the fiber density and strength to resist the tearing away from the concrete.

Other Plywood Uses

Some fairly low quality plywood is used for structural wall sheathing. Where structures are built as a package as in factory-built homes, plywood is used to give the strength and rigidity required. If drywall is used on these structures, problems are experienced in moving the unit. Other wall sheathing materials used in conventional structures may not be more than half the price of plywood.

Some plywood is used for soffits, but this was mentioned infrequently.

Substitutes and Factors That Influence the Choice of Materials

Roof Sheathing.

There doesn't seem to be anything coming on the market that will replace plywood in this use unless prices rise to the level of summer, 1969. At that time some of the "pressed wood" products such as particleboard or hardboard were tried. Board lumber was not substituted because it was not readily available and the labor factor still operated against this alternative.

The 5/8 inch thickness seemed to be prevalent for plywood roof sheathing but 1/2 inch thickness was not uncommon. The 1/2 inch material meets the structural requirements and is FHA approved but it does cause problems if people walk on the roof to mount a TV antenna, etc. The flexibility of the material will push holes in many of the roofing materials used today and cause leaks. Another disadvantage of the thinner material is that it has less nail holding ability. The price difference may be $10 per thousand square feet but sometimes prices are the same.

If manufacturers would use just exterior glue for sheathing plywood some of the weathering problems could be avoided. On the western slope of Colorado, spruce plywood had been tried in the past but at that time the quality didn't seem to be comparable with West Coast plywood.

Sub-flooring and Underlayment.

Particleboard has almost completely replaced plywood for underlayment because it is a more dense material, smoother, and without voids. There is not the danger of women's shoe heels penetrating the voids and thus ruining a floor. In addition, the adhesives or cements adhere to particle board better than plywood because it does not absorb as much.

There was some doubt about the advisability of using the "2-4-1" floor system which is a 3/4 inch tongue and groove one layer system. It probably meets the engineering requirements but the voids in the plywood may shorten the floor's serviceability considerably.

About the only use of plywood in mobile camper type construction is for subflooring using 5/8 inch Douglas Fir material. Little plywood flooring is used in commercial buildings and high rise apartments since most floors are concrete.

Paneling.

People that are doing inexpensive building jobs will use the printed photographic panels. Once the material is marred, it is "done for life." There is no way you can repair it except to replace it. A builder can afford to pay $3 to $5 a sheet more in order to get wood paneling.

Many of the plywood panels have a plastic coating or vinyl overlay which have been accepted by hospitals or in places that have extreme cleanliness requirements. One item that is becoming particularly popular in this area as an alternate to plywood is aspen lumber paneling. The product is a prestained interior paneling either smooth or textured. Aspen itself has a very beautiful grain.

Form work.

In commercial work a metal frame system is utilized, but the panels are a "prime form" plywood which are replaced as needed. There is also a "simplex form" which utilizes heavy plywood, 5/4 inch material, which has been acceptable for building a straight, house-type foundation. Much of the plywood used for forming is coated with a plastic or other material which will release from the concrete without major damage, thereby lengthening the life of the forms.

However, there is some concern that these products are not giving the service expected. Another product identified as "Zeiman's Form" was said to have advantages over plywood in that it had greater strength and will allow considerably more reuses than conventional plywood, but it is too expensive to cut when the building has irregular sections.

In commercial work, steel forms are sometimes used, but they were not considered to be the most desirable because they leave small grooves which have to be rubbed or ground off. A number of contractors still use 1 inch x 8 inch boards for single family home forming and then strip the boards and use them for the subfloor. When there are many odd dimensions on a house and plywood is used, too much material is wasted because it becomes non-reusable panels.

Other Uses.

In using plywood for cabinets, it is necessary to go to a fairly expensive grade or the finish is unacceptable to the customer. Particleboard has replaced plywood to a significant degree in cabinets and bathroom counters. However, a plywood veneer facing with particle board backing is much in evidence. The particleboard does not warp as quickly as plywood when used where moisture may be high.

FACTORS INFLUENCING THE CHOICE OF MATERIALS

The rapid development of new materials has been noted previously in this paper. It has also been indicated that different materials function more or less satisfactorily than plywood in alternative uses. As we see increasing pressures to reduce building and construction costs and to improve the performance of the industry, it becomes very important to recognize where decisions are made and what factors are dominant in the decision making process so that corrective action can be taken.

Highways and Bridges.

In the case of highways and bridges the materials used are primarily concrete and structural steel. Material suppliers must meet state specifications but no particular brand is required. State inspectors check materials and the structures as construction is in process.

Commercial, Multiple Family and Public Buildings.

Most contractors obtain work through competitive bidding. They have little control over changes or new products that are introduced. Architects will frequently specify a certain brand of material or its equivalent. When there are many

suppliers of similar products three or four brands may be specified. If there is some supplier that has a material that he thinks is equal to materials specified, he sends literature to the architect prior to bid opening and then the architect may issue an approval on it.

Two major considerations which govern the selection of material are: first, the budget allocated for the project and second, the functional use that will be expected from the building. For example, in a college dormitory the budget is very limited and maintenance costs are very important. Sometimes because of budget limitations, architects make a mistake in selecting materials which do not hold up in the long run. Contractors and architects like to use materials that can stand up on their own just by the nature of the material, i.e. masonary, rough wood, plaster board, etc.

A primary factor which guides the selection of materials according to the functional use of the building is the building code. The building code specifies the general types of material that can be used within limits by meeting the performance and fire code requirements. The manufacturers must have their products tested by one of the national institutes to determine

whether or not products meet standards required for different uses and meet the functional ability claimed by manufacturers. Consideration is first given to materials that will satisfy the fire code and then the one selected must satisfy structural and aesthetic needs at an economical cost. Final decisions on materials are made in consultation with the clients. The customer consults the architect and roughs out the type of building that he wants without too much thought to costs. Then it comes to the point where contractors bid on the project after which negotiations are carried on with the customer and he will change some of the materials required. Ninety percent of the building work goes through such a process. For something like concrete, contractors and architects rely almost entirely on structural engineers' specifications for the dimensions and design.

For national contractor companies that specialize in particular packages and bid on particular products, the headquarters offices issue engineering material bulletins which are sent to the field offices. This bulletin identifies the materials that are acceptable for different uses. The local offices must then determine whether the materials meet the requirements in a particular locality. In regions where

economic conditions are somewhat depressed, invariably the building projects have a rather austere budget. For that reason architects or contractors seldom use exotic or new materials. They stay with proven quality materials. If an architect works on a job in an area unfamiliar to him, contractors attempt to work very closely with him so that something isn't specified that has been proven unsatisfactory in the area.

To re-emphasize the dilemma of architects and contractors one notes that it makes quite a difference whether a hospital or school is being built as opposed to a bank building or a motel. Generally there are totally different problems associated with selecting materials for a motel which is supposed to have a life of around fifteen years versus a school house that is supposed to have a life of from thirty to forty years or even fifty to sixty years. There is always some degree of compromise in the selection of materials between the initial cost, maintenance cost and performance. The cost can vary between $15 a square foot to $35 a square foot depending on the type of structure and client.

The smaller contractors do not have much flexibility. For example, saw mills in local areas can turn out only cer-

tain quantities of certain grades of lumber. When architects specify a higher grade of lumber than is readily available the bid must be passed. Since small builders are not able to evaluate the details of the plan or the requirements, they are forced to buy the grade specified without an opportunity to negotiate for substitution of other materials.

Single Family Homes.

For single family homes building codes specify general types of materials that are acceptable and identify minimum grades and strength requirements. There are also FHA and VA specifications which must be satisfied to qualify for loan approvals from these agencies. Most new products as a practical matter have to be approved by FHA. If something is incorporated that is new it can cause a big problem and perhaps invite a delay in "cutting the red tape" to gain approval. For example, it took years to gain approval for a change in the dimensions of lumber. (The U. S. Commerce Department recently established a new standard for softwood milled sizes and moisture content.)

Architects in the more sparsely populated areas have not changed much in material selection. For one reason, the source of supply is distant and once labor learns to use a

material, it is fairly difficult to change. For example, using particleboard for a particular use one day and plywood the next would confuse the crews; the labor costs would go up, and efficiency would decline. The kinds of materials used will also depend upon the economic situation and the general income of the people in the area.

Where an architect designs the house, he selects the materials and the contractor negotiates the price or bids on specifications of the architect. If the contractor is involved in the initial stages of planning with the client or the architect, he may suggest materials for the architect to consider incorporating in the plan. When the contractor has his own design department or hires a designer, the materials are selected by the designer. The small contractor relies on lumber yard dealers for advice in material selection and in making cost estimates. An effort is made to select materials available locally to avoid delay in ordering new materials. Home buyers still have much to do with what their house will look like. People who are buying homes are more educated and their income is relatively higher than several years ago; therefore, they are demanding a better product.

Lumber Yards.

As far as lumber yards are concerned, they stock items that contractors or customers use most. This is frequently on a demand basis because the general public covers the news media better than any one dealer, thus, when a customer asks for a product this calls the product to the dealer's attention. When a customer inquires about the availability and price of a certain material, the salesman will sometimes attempt to sway the choice, but with a contractor customer this doesn't happen very often.

Prefab and Modular Manufacturing.

The materials selected for prefab manufacturing for homes and commercial or industrial purposes are mostly governed by engineering requirements. The products must meet city or FHA approval. In modular construction the desires of the customer are adhered to, but in consultation with the architects and engineers,recommendations are made to prevent customers from selecting units which will not satisfy their requirements.

New Products and Changes in Use of Construction Materials

Bridges

In highway construction and bridge work the major change

that has occurred in the last eight to ten years is the use of prestressed beams in place of structural steel. The industry has thought that the former material is cheaper, but many doubt that this is so now. There isn't too much that can be changed on a bridge. The piers and the deck are concrete. Plastic is not playing any role at all and reinforcing steel is still necessary. Twenty years ago shiplap was used for forms but starting in about 1949 everyone switched to plywood.

Factories and Warehouses.

Precast panels with concrete or concrete slabs are being used for walls of warehouses. On the western slope of Colorado there is increased use of metal buildings especially for storage sheds. The material available has a 15 year guarantee to hold the paint. One would have to paint a wood barn three or four times to maintain it in the same condition. In the Denver area wood, such as fire proofed laminated beams and plywood laminated roofs, is being used extensively for large warehouses. In some of the manufacturing plants there has been quite a serious corrosion problem with steel beams. To solve this the architects and contractors have gone more to laminated timber construction. This material has equivalent protection against fire hazards and it has proven to be actually

more economical than steel. The industry has gone in a circle on material use. Some of the older mills used to have a considerable amount of wood in them, and then for a period there was no wood at all. Now industry is going back to wood. However, when the cost of wood goes up to a level higher than the cost of steel, things may change again. The plastics industry is advancing and will be quite a strong competitor in the future although there are a lot of limitations on plastics because of fire regulations.

Commercial, Public, and High-rise Apartment Buildings.

In the larger cities commercial buildings are being built to utilize glass and drapes in places where previously masonary walls were used. Where possible, concrete is used in place of brick to reduce labor costs. A considerable amount of concrete block is being used as a structural material for walls where it is necessary to have a durable building and good fire resistance. It is a relatively inexpensive material. The blocks can be painted or treated with different kinds of patterns which make a fairly interesting effect. In the schools masonary walls are used for partitions. Architects are specifying concrete floors and even suspended concrete floors are used for the roof system. Acoustical tile is used every place possible.

Carpets are used on the floors and vinyl soundproof sliding doors are replacing wood doors. As far as wood materials there seems to be a big future in building, especially in the laminated beams and wood deckings. Some fir or cedar four inch tongue and groove decking is used. It is finished on the bottom and this serves as the ceiling. The big laminated beams eliminate the need for rafters or trusses.

In school construction architects do not necessarily look upon prestressed concrete as a replacement for wood. It is a replacement for noncombustible materials. For example, wood framed roofs are made of "truss joists" which is a trade name for a composite truss made out of wood cores and metal tubing. It is a very highly efficient invention or design which is patented and available from just one company. This system reflects an effort to engineer wood so that it is not necessary to use wood just as it is sawed at the mill. The unit provides a wood nailing surface on the top and bottom so that roof decking can be attached to the top and some kind of a ceiling nailed to the bottom. This unit will span much greater distances than can be achieved with strictly wood joists at a comparable cost. Steel studs are replacing wood in office buildings. It is a matter of an educational process

to adapt to this change. Plastic veneered doors with wood core is also becoming more important and it reduces the amount of wood used. Metal cored doors have eliminated wood completely.

Mobile Homes and Travel Trailers, Prefabricated and Modular Components.

In campers and mobile trailers many more of the laminates are being used. The cabinet door and drawer material is changing from conventional wood and going to the plastics. Fiberglass is being utilized more for the exterior surface replacing some of the metals.

In the basic construction of trailers native timber is used in the form of 2 x 2's and 2 x 4's. The only other wood used is 5/8 inch fir plywood for the sub-floor. Plywood paneling was formerly used on the walls; now new scuff proof vinyl materials are available which look richer and are cheaper. Hardboard backing materials are frequently used in place of plywood. This material is also used for ceilings. Every effort is made to cut labor costs, therefore, wood trim moldings have been replaced by plastics because the latter material can be installed more rapidly and plastic is less expensive. Particleboard with a formica laminate is used for table and cabinet tops.

In the modular buildings advantage is being taken of some of the plastics. Instead of just plain dry wall, fiberboard acoustical type ceilings are being used. Increasing use will be made of "sandwich" walls with plywood veneers and styrofoam centers. Plywood, sheet rock or some other material can be used to serve as both an exterior and interior wall.

Single Family Homes.

As far as siding materials, "masonite" is coming out with some of the most competitive type products. They are pre-finished and they have been effective in replacing plywood for siding materials and for soffits. Another product replacing plywood is a gypsum type material that is used for soffits and the ceiling on the underside of porches. It is a water proofed material.

Plywood is hard to replace for structural sheathing. Sheet rock is being used for the interior finish on the average house where the budget is relatively limited and also in higher priced homes. Where a pleasant panel effect is desired, plywood is used over the sheet rock to replace the painted wall surfaces. When the budget will allow a durable wall finish, vinyl wall coverings are used. It provides a permanent color as well as

a variety of textures and the material can be washed and wiped and will endure much abuse. Some companies are coming out with a sheet rock that has the vinyl covering attached directly at the factory which saves labor for one application. In spite of the transition that is taking place in using new materials, rural areas do not seem to be affected as much as urban areas.

Steel and aluminum items will probably be utilized in increasing amounts for family homes and replace plywood and other wood materials. The main reason this will happen is because there are certain shortages in the lumber industry. Many competitors are trying to get into the building industry and will do so with new products. Evidence of the transition is the use of metal for wardrobe doors.

General Attitudes Toward Wood Products

Lumber dealers all over the Denver trade area have considered lumber as kind of a "holy thing." It now appears that the industry is moving into an era where synthetics and plastics are going to take over a tremendous amount of the uses where formerly only lumber was considered. The lumber business itself will have to alter its thinking. Many do-it-yourself people will buy new products if they are displayed.

People have no knowledge of new products until they can be made aware of them through the retail lumber dealers.

Even though there are many new materials being developed, a view held by many in the building industry is that there will always be a market for wood. There is nothing finer than wood for finishing, and from consumer acceptance point of view, wood cannot be surpassed for a certain warmth or atmosphere that it creates in a building. Representatives from rural areas indicated that wood was being used much the same way that it was ten to thirty years ago. One reason for this is that the mechanics in the area are trained to use wood. Therefore, when a material of comparable cost is used it changes the total labor market. When the prices of wood materials were so high in 1968-69 some of the steel materials were considered as a substitute but specialized labor for installing steel partitioning, etc. was not available in the area. New Mexico contractors indicated that even when prices rose, they just substituted a different species of wood and not a different kind of material. Plywood and lumber was normally bought from the west coast but they started buying from Louisiana. Prices of the southern pine area fluctuates about two months after the west coast prices. Rural areas, in particular,

indicated that very little native lumber was used. The lumber that is used in commercial building is pretty much west coast lumber.

When prices of lumber were high a few months ago, some contractors in Colorado started using metal studs with sheet rock. However, when metal studs are used the wall does not have the bearing qualities that wood partitions have.

It appears that the type of window used in homes will change again. The industry has been using aluminum window frames but during the last ten to twelve years there have been many problems with this material. It conducts the cold into buildings thereby increasing heating costs and glass is cracked as aluminum shrinks and expands. Many builders are going back to wood until something better can be found. The weakness of wood is that preventive maintenance must be used. One way used to reduce maintenance is wrapping wood products in vinyl covering.

A complaint echoed throughout the Denver trade area was that manufacturers oversell products. For example, some salesmen have claimed that interior plywood with fortified or heavy glue will withstand six months weathering. Another consensus was the concern about the high cost of the wood

products. This has initiated a vigorous search for substitute materials. However, the transition will not be complete or immediate.

The Future for Plywood as a Building Material

Although many products are being developed which compete directly or indirectly with plywood, the probability that plywood will remain in a viable competitive position for some time to come is very good. In the first place, plywood manufacturers are not standing still in their efforts to improve the product for present uses and to adapt their products for new uses. Second, in such uses as roof sheathing and subflooring, there are no serious competing products which can match plywood for performance and cost. Third, wood products are held in high regard by consumers and builders and these tastes are not rapidly altered. Fourth, there is a large backlog in demand for construction of all types. Once the economy moves out of the present recession and building funds are made available, building will accelerate and the demand for plywood will increase even if it does not maintain its present market share. Finally, when standard materials are replaced by new materials, it requires a change in training the labor force and this also is not a rapid process.

APPENDIX I

Table 1. Response to initial classification questionnaire, Denver Trade Area, 1969

Location	Plywood Users	Plywood Non-users	Total Number of Firms Responding
Denver	207	21	228
Colorado Springs	38	3	41
Pueblo	10	1	11
Boulder	25	1	26
Colorado (Misc.)	130	41	171
Albuquerque	48	11	59
New Mexico (Misc.)	36	4	40
Wyoming	45	14	59
Arizona, Kansas, Utah	21	16	37
Total	560	112	672

Table 2. Response to follow-up classification questionnaire, Denver Trade Area, 1969

Location	Questionnaires Mailed	Returned Undeliverable	Responses		
			Plywood Users	Plywood Non-users	Total
Denver	450	16	118	23	141
Colorado Springs	196	11	53	17	70
Pueblo	62	1	16	3	19
Boulder	92	12	37	3	40
Colorado (Misc.)	584	25	180	44	224
Albuquerque	276	5	69	28	97
New Mexico (Misc.)	232	21	57	12	69
Wyoming	259	4	79	26	105
Total	2,151	95	609	156	765

Table 3. Summation of responses to classification questionnaires.

Location	Contacted by Classification Questionnaire (A)	(B)	Total Firms Contacted	Total Firms Responding	Percent Response
Denver	228	450	678	369	54.4
Colorado Springs	41	196	237	110	46.6
Pueblo	11	62	73	30	41.1
Boulder	26	92	118	66	55.9
Colorado (General)	171	584	755	395	52.3
Albuquerque	59	276	335	156	46.6
New Mexico (General)	40	232	272	109	40.1
Wyoming	59	259	318	164	51.6
Arizona, Kansas, Utah	37	0	37	37	100.0
Total	672	2151	2823	1436	50.8%

Table 4. Number and percent of telephone interviews completed with distributors of plywood, Denver trade area, 1969.

Location	Total Number Firms Distributing Plywood	Telephone Interviews Completed	% of Total Firms
Denver	100	16	16.0
Colorado Springs	18	5	27.8
Pueblo	15	4	26.7
Boulder	9	4	44.4
Colorado (Misc.)	178	45	25.3
Wyoming	61	11	18.0
Albuquerque	42	6	14.3
New Mexico (Misc.)	48	7	14.6
Arizona/Kansas/Utah	11	--	--
Total	482	98	20.5

Table 5. Percentage shares and amounts of softwood plywood purchased by wholesale and retail dealers, Denver trade area, 1969.

	Firms Purchasing				
	Over 1 Million sq. ft.	250,000 to 1 Million	Less than 250,000	Totals	
No. of Dealers	16	36	46	98	
% of Total	16.4	36.7	46.9	100	
Softwood Plywood Thickness					
	Thousand Square Feet				
1/4	3999	2102	612	6713	(10.1)*
3/8	4776	2229	438	7443	(11.2)
1/2	22,375	10,115	1642	34,132	(51.4)
5/8	5047	2872	651	8570	(12.9)
3/4	5190	2789	732	8711	(13.1)
Other (3/16, 5/16)	480	302	98	880	(1.3)
Total Amount Handled	41,867	20,409	4173	66,449	(100.0)
Total Amount Handled (3/8" Basis)	56,387	27,683	5649	89,719	
% of Total	62.8	30.9	6.3	100	

*Figures in parentheses represent the percentage shares of total softwood plywood in each thickness.

Table 6. Percentage shares and amounts of hardwood plywood purchased by wholesale and retail dealers, Denver trade area, 1969.

	Firms Purchasing Over 1 Million sq. ft.	250,000 to 1 Million	Less than 250,000	Totals	
No. of Dealers	16	36	46	98	
% of Total	16.4	36.7	46.9	100	
Hardwood Plywood Thickness					
	Thousand Square Feet				
1/4	971	611	718	2300	(25.6)*
3/8	61	19	15	95	(1.1)
1/2	61	20	8	89	(1.0)
5/8	61	27	52	140	(1.6)
3/4	1108	836	284	2228	(24.8)
Prefinished Panelling (6mm and 3/16)	885	2761	469	4115	(45.9)
Total Amount Handled (sq. ft.)	3147	4274	1546	8967	(100.0)
Total Amount Handled (3/8" Basis) (sq. ft.)	3664	4011	1474	9149	
% of Total	40.1	43.8	16.1	100	

*Figures in parentheses represent the percentage shares of total hardwood plywood in each thickness.

Table 7. Sources of softwood plywood handled by wholesale and retail dealers, Denver trade area, 1969. (Figures in thousands of square feet, 3/8 inch basis.)

Sources:	Mills * In	Mills * Out	Wholesale or Retail Dealers In	Wholesale or Retail Dealers Out	Other In	Other Out	Totals
Firms Purchasing 1 million sq. ft. or +							
Amount	none	29,040	27,009	338	none	none	56,387
% of Total	--	51.5	47.9	0.6	--	--	100
		(74.8)	(64.1)	(4.9)**			
250,000 - 1 million							
Amount	1245	9024	11,931	5483	none	none	27,683
% of Total	4.5	32.6	43.1	19.8	--	--	100
	(66.1)	(23.2)	(28.3)	(79.7)			
Less than 250,000							
Amount	638	768	3187	1056	none	none	5649
% of Total	11.3	13.6	56.4	18.7	--	--	100
	(33.9)	(2.0)	(7.6)	(15.4)			
Total Amount from each source	1883	38,832	42,127	6877	none	none	89,719
	(100)	(100)	(100)	(100)			
% of Total from each source	2.1	43.3	46.9	7.7	--	--	100

*In-Out denotes within the study area or outside the study area.

**Percentages in parentheses denote the shares of the total plywood from each source that was purchased by each size group of firms.

Table 8. Sources of hardwood plywood handled by wholesale and retail dealers, Denver trade area, 1969. (Figures in thousands of square feet, 3/8 inch basis.)

	Mills		Wholesale or Retail Dealers		Other		Totals
	In	Out*	In	Out	In	Out	
Firms Purchasing 1 million sq. ft. or +							
Amount	none	1554	1930	151	29	none	3664
% of Total	--	42.4 (51.4)	52.7 (50.0)	4.1 (10.0)	0.8 (100)**	--	100.0
250,000 - 1 million							
Amount	none	1408	1075	1095	none	433	4011
% of Total	--	35.1 (46.6)	26.8 (27.9)	27.3 (72.9)	--	10.8 (58.7)	100.0
Less than 250,000							
Amount	none	60	852	257	none	305	1474
% of Total	--	4.1 (2.0)	57.8 (22.1)	17.4 (17.1)	--	20.7 (41.3)	100.0
Total Amount from each source	none	3022 (100)	3857 (100)	1503 (100)	29 (100)	738 (100)	9149
% of Total from each source	--	33.0	42.2	16.4	0.3	8.1	100.0

*In-out denotes within the study area or outside the study area.

**Percentages in parentheses are calculated on row totals.

Table 9. Plywood purchases classified by location, Denver trade area, 1969.

Location	Number of Firms	Amount of Plywood Purchased for Distribution Softwood	%	Hardwood	%
Denver	16	33,204*	50.0	5,048*	56.3
Colorado Springs	5	2,458	3.7	178	2.0
Pueblo	4	2,296	3.4	406	4.5
Boulder	4	5,120	7.7	421	4.7
Colorado (Misc.)	45	11,299	17.0	1,479	16.5
Albuquerque	6	6,046	9.1	939	10.5
New Mexico (Misc.)	7	2,525	3.8	52	0.6
Wyoming	11	3,501	5.3	444	4.9
Total	98	66,449	100.0	8,967	100.0

*Thousands of square feet, surface measure.

Table 10. Disposal of softwood plywood by wholesale and retail dealers, Denver trade area, 1969.

	Firms Purchasing			
	Over 1 Million	250,000 to 1 Million	Less than 250,000	Totals
Sold to others:				
Amount*	55,992	26,797	5,570	88,359
% of Total	63.4	30.3	6.3	100.0
	(99.3)**	(96.8)	(98.6)	(98.5)
Used within firm:				
Amount*	395	886	79	1,360
% of Total	29.0	65.1	5.9	100.0
	(0.7)	(3.2)	(1.4)	(1.5)
Total amount for each group*	56,387	27,683	5,649	89,719
% of Total	62.8	30.9	6.3	100.0
	(100)	(100)	(100)	(100.0)

*Thousands of square feet, 3/8 inch basis.
**Percentages in parentheses are calculated on row totals.

Table 11. Disposal of hardwood plywood by wholesale and retail dealers, Denver trade area, 1969.

	Firms Purchasing			
	Over 1 Million	250,000 to 1 Million	Less than 250,000	Totals
Sold to others:				
Amount*	3656	4007	1450	9113
% of Total	40.1	44.0	15.9	100.0
	(99.8)**	(99.9)	(98.4)	(99.6)
Used within firm:				
Amount*	8	4	24	36
% of Total	22.2	11.1	66.7	100.0
	(0.2)	(0.1)	(1.6)	(0.4)
Total amount for each group*	3664	4011	1474	9149
% of Total	40.0	43.9	16.1	100.0
	(100.0)	(100.0)	(100.0)	(100.0)

*Thousands of square feet, 3/8 inch basis.

**Percentages in parentheses are calculated on row totals.

Table 12. Market groups to whom softwood plywood was sold in the Denver trade area, 1969.

	To Whom Sold						
	Other Dealers	Contractors	Industrial Users	Farms + Ranches	Do-it-Yourself Customers	Other Users	Ttl.
Firms Purchasing:							
1 million or +							
Amount*	4031	36,786	4311	none	10,864	none	55,992
% of Total	7.2	65.7	7.7	--	19.4	--	100
	(82.5)	(63.2)	(81.8)		(55.1)		(63.4)
250,000-1 million							
Amount*	831	18,222	857	54	6833	none	26,797
% of Total	3.1	68.0	3.2	0.2	25.5	--	100
	(17.0)	(31.3)	(16.3)	(18.4)	(34.6)		(30.3)
Less than 250,000							
Amount*	22	3175	100	240	2033	none	5570
% of Total	0.4	57.0	1.8	4.3	36.5	--	100
	(0.5)	(5.5)	(1.9)	(81.6)	(10.3)		(6.3)
Total amount sold*	4884	58,183	5268	294	19,730	none	88,359
% of Total	5.5	65.8	6.0	0.3	22.4	--	100
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)		(100.0)

*Thousands of square feet, 3/8 inch basis.
**Percentages in parentheses are calculated on row totals.

Table 13. Market groups to whom hardwood plywood was sold in the Denver trade area, 1969.

To Whom Sold	Firm Purchasing Over 1 million sq. ft. Amount* Sq. Ft.	% of Total**	Firm Purchasing 250,000 to 1 million sq. ft. Amount* Sq. Ft.	% of Total	Firm Purchasing less than 250,000 sq. ft. Amount* Sq. Ft.	% of Total	Total Amount* Sold	% of Total
Other Dealers	260	7.1 (37.5)	4	0.1 (0.6)	429	29.5 (61.9)	693	7.6 (100.0)
Contractors	1,759	48.1 (41.9)	1,122	28.0 (33.1)	507	34.8 (15.0)	3,388	37.2 (100.0)
Industrial Users	676	21.0 (91.1)	56	1.4 (6.7)	19	1.3 (2.2)	842	9.2 (100.0)
Farms & Ranches	none	--	none	--	45	3.1 (100.0)	45	0.5 (100.0)
Do-it-Yourself Customer	870	23.8 (21.0)	2,825	70.5 (68.2)	450	31.0 (10.8)	4,145	45.5 (100.0)
Other Users	none	--	none	--	none	--	none	--
TOTALS	3,656	100 (40.1)	4,007	100 (44.0)	1,450	100 (15.9)	9.113	100 (100.0)

*Thousands of square feet, 3/8 inch basis

**Percentages in parentheses are calculated on row totals.

Table 14. Average proportion of building materials value represented by plywood in purchases and sales of DISTRIBUTORS, by location, Denver Trade Area, 1969.

Location	Plywood Value as a percent of purchases	Plywood Value as a percent of sales
Denver	29	28
Colorado Springs	14	14
Pueblo	21	21
Boulder	21	21
Colorado (general)	16	19
Albuquerque	35	31
New Mexico (general)	14	14
Wyoming	18	18
Average All Firms	21	20

Table 15. Sample for completion of detailed questionnaires by telephone interviews by location and type of construction, Denver trade area, 1969.

Location	Number of Construction Companies			Total Interviews Completed	Total Number of Plywood-Using Firms	% Interviewed
	Single-Family	Multi-Family	Non-Residential			
Denver	33	8	22	63	646	9.8
Colorado Springs	11	3	5	19	161	11.8
Pueblo	3	0	3	6	52	11.5
Boulder	7	2	1	10	95	10.5
Colorado (Misc.)	22	4	14	40	479	8.4
Albuquerque	4	1	16	21	191	11.0
New Mexico (Misc.)	9	0	9	18	165	10.9
Wyoming	7	2	12	21	186	11.3
Arizona, Kansas, Utah	--	--	--	--	9	--
Totals	96	20	82	198	1984	10.0

Table 16. Amount of plywood used by type of construction, Denver trade area, 1969.

Type of Construction	Total* Softwood Plywood	% of Total Softwood	Total* Hardwood Plywood	% of Total Hardwood
Single Family	16,239	54.7	1,308	40.6
Multi Family	3,663	12.4	91	2.9
Non-Residential	9,776	32.9	1,820	56.5
Totals	29,678	100.0	3,219	100.0

*Thousands of square feet, 3/8 inch basis

Table 17. Softwood plywood used in single family housing construction by location and thickness, Denver trade area, 1969.

Location	No. of firms Interviewed	Softwood Plywood Thickness					Total Amount Used	Total Amount (3/8" basis)	% of Total (3/8" basis)
		1/4	3/8	1/2	5/8	3/4			
		Thousands of square feet							
Denver	33	101	464	3,377	296	561	4,799	6,649	40.9
Colorado Springs	11	10	1,062	373	98	444	1,987	2,617	16.1
Pueblo	3	--	14	124	23	87	248	391	2.4
Boulder	7	17	295	1,342	64	19	1,737	2,240	13.8
Colorado (Misc.)	22	3	56	592	157	117	925	1,343	8.3
Albuquerque	4	--	117	1,108	35	3	1,263	1,658	10.3
New Mexico (Misc.)	9	36	198	274	19	27	554	673	4.1
Wyoming	7	--	59	365	12	51	487	668	4.1
Totals	96	167	2,265	7,555	704	1,309	12,000	16,239	100.0
% of Total		1.4	18.9	62.9	5.9	10.9			

Table 18. Hardwood plywood used in single family housing construction by location and thickness, Denver trade area, 1969.

Location	No. of Firms Interviewed	1/4	3/8	1/2	5/8	3/4	Other	Total Amount Used	Total Amount (3/8" basis)	% of Total (3/8" basis)
		Thousands of square feet								
Denver	33	406	15	--	47	30	19	517	434	33.2
Colorado Springs	11	90	51	--	--	75	--	216	261	19.9
Pueblo	3	9	--	--	--	5	--	14	16	1.2
Boulder	7	208	128	--	--	--	80	416	307	23.5
Colorado (Misc.)	22	30	--	--	--	11	--	41	42	3.2
Albuquerque	4	50	--	--	--	44	--	94	121	9.3
New Mexico (Misc.)	9	12	--	--	--	31	--	43	70	5.4
Wyoming	7	23	--	23	3	3	--	52	57	4.3
Totals	96	828	194	23	50	199	99	1,393	1,308	100.0
% of Total		59.4	13.9	1.7	3.6	14.3	7.1			

Table 19. Sources of plywood used in single-family housing construction, Denver trade area, 1969.

Location	Softwood Plywood Sources					Hardwood Plywood Sources				
	Wholesale Dealer		Retail Dealer			Wholesale Dealer		Retail Dealer		
	Amount*	%	Amount*	%	Total*	Amount*	%	Amount*	%	Total*
Denver	649	13.5	4,150	86.5	4,799	58	11.2	459	88.8	517
Colorado Springs	312	15.7	1,675	84.3	1,987	31	14.4	185	85.6	216
Pueblo	75	30.2	173	69.8	248	3	21.4	11	78.6	14
Boulder	19	1.1	1,718	98.9	1,737	--	--	416	100.0	416
Colorado (Misc.)	177	19.1	738	79.8	925[a]	7	17.1	34	82.9	41
Albuquerque	240	19.0	1,023	81.0	1,263	70	74.5	24	25.5	94
New Mexico (Misc.)	--	--	554	100.0	554	--	--	43	100.0	43
Wyoming	--	--	267	54.8	487[a]	--	--	32	61.5	52[a]
Totals	1,472	12.3	10,298	85.8	12,000[a]	169	12.1	1,204	86.4	1,393[a]

*Thousands of square feet, surface measure

[a]These totals include the amounts of plywood imported into the study area from sources outside the study area and hence not accounted for in this source classification.

Table 20. Sources of plywood by type of construction, Denver trade area, 1969.

Type of Construction	Softwood Plywood Sources					Hardwood Plywood Sources				
	Wholesale Dealer		Retail Dealer			Wholesale Dealer		Retail Dealer		
	Amount*	%	Amount*	%	Total*	Amount*	%	Amount*	%	Total*
Single family	1,472	36.7	10,298	64.5	12,000	169	14.7	1,204	77.3	1,393
Multi family	561	14.0	2,060	12.9	2,631	--	--	84	5.4	84
Non-residential	1,979	49.3	3,617	22.6	5,747	984	85.3	270	17.3	1,255
Totals	4,012	100.0	15,975	100.0	20,378	1,153	100.0	1,558	100.0	2,732

*Thousands of square feet, surface measure

Table 21. Softwood plywood applications in single family housing construction, Denver trade area, 1969.

Location	Type of Application										
	Roof Sheathing	Wall Sheathing	Siding	Soffit	Sub-Flooring	Floor Under-Layment	Concrete Formwork	Wall Paneling	Cabinets	Other	Total
	Thousands of square feet										
Denver	2,189	6	49	411	1,812	214	3	15	23	77	4,799
Colorado Springs	1,083	3	10	32	841	18	--	--	--	--	1,987
Pueblo	110	--	--	14	80	--	--	--	44	--	248
Boulder	857	10	10	19	809	--	10	--	--	22	1,737
Colorado (Misc.)	446	3	4	71	328	17	10	25	21	--	925
Albuquerque	1,147	--	--	24	45	--	36	--	11	--	1,263
New Mexico (Misc.)	273	--	38	24	181	--	10	5	23	--	554
Wyoming	252	8	--	58	162	--	1	--	6	--	487
Totals	6,357	30	111	653	4,258	249	70	45	128	99	12,000
% of Total	53.0	0.2	0.9	5.4	35.5	2.1	0.6	0.4	1.1	0.8	100.0

Table 22. Hardwood plywood applications in single family housing construction, Denver trade area, 1969.

Location	Type of Application: Finish Flooring	Wall Paneling	Siding	Cabinets & Shelving	Other	Total
		Thousands of square feet				
Denver	--	429	55	18	15	517
Colorado Springs	--	75	34	107	--	216
Pueblo	--	--	--	14	--	14
Boulder	160	174	--	82	--	416
Colorado (Misc.)	--	26	--	15	--	41
Albuquerque	--	50	--	44	--	94
New Mexico (Misc.)	--	11	--	32	--	43
Wyoming	16	36	--	--	--	52
Totals	176	801	89	312	15	1,393
% of Total	12.6	57.5	6.4	22.4	1.1	100.0

Table 23. Amounts and percentages of plywood used for new construction and remodeling in single family housing construction, Denver trade area, 1969. (Figures in thousands of square feet, surface measure.)

	Softwood Plywood Usage					Hardwood Plywood Usage				
	New Construction		Remodeling			New Construction		Remodeling		
Location	Amount	%	Amount	%	Total	Amount	%	Amount	%	Total
Denver	4,408	91.9	391	8.1	4,799	440	85.1	77	14.9	517
Colorado Springs	1,963	98.8	24	1.2	1,987	203	94.0	13	6.0	216
Pueblo	219	88.3	29	11.7	248	3	21.4	11	78.6	14
Boulder	1,661	95.6	76	4.4	1,737	96	23.1	320	76.9	416
Colorado (Misc.)	733	79.2	192	20.8	925	17	41.5	24	58.5	41
Albuquerque	1,242	98.3	21	1.7	1,263	88	93.6	6	6.4	94
New Mexico (Misc.)	486	87.7	68	12.3	554	35	81.4	8	18.6	43
Wyoming	449	92.2	38	7.8	487	24	46.2	28	53.8	52
Totals	11,161	93.0	839	7.0	12,000	906	65.0	487	35.0	1,393

Table 24. Average market share held by plywood and competing products for selected uses in SINGLE FAMILY HOMES, Denver Trade Area, 1969.

Use and Product	Location							
	Denver	Colo. Spgs.	Pueblo	Boulder	Colo. (Gen.)	Albuquerque	New Mexico (Gen.)	Wyoming
	Percent							
Roof Sheathing								
Plywood	98	99	100	100	100	100	90	99
Handboard	2	1	0	0	0	0	0	1
Boards	0	0	0	0	0	0	10	0
Wall Sheathing								
Plywood	*	*	*	*	*	*	*	*
Handboard(cellotex)	*	*	0	0	*	0	0	0
Sheet Rock	*	0	0	0	0	0	0	0
Gypson Board	0	*	0	0	0	0	0	0
Composition Bd.	0	0	0	0	*	0	0	*
Siding								
Plywood	63	*	*	0	*	0	0	0
Hardboard	9	*	0	0	0	0	*	*
Cedar	15	0	0	0	*	0	0	0
Asbestos	13	0	0	0	*	0	*	0
Soffit								
Plywood	92	80	*	*	100	*	*	*
Hardboard	8	20	0	*	0	*	0	0
Subflooring								
Plywood	96	81	*	*	73	*	80	98
Hardboard	4	19	0	0	27	0	3	0
Concrete	0	0	0	0	0	0	14	0
Board	0	0	0	0	0	0	3	2
Floor Underlayment								
Plywood	*	*	0	0	*	0	0	0
Hardboard	*	0	0	0	*	0	0	*
Concrete Form Work								
Plywood	*	0	*	*	*	0	0	0
Hardboard	0	0	*	0	0	0	0	0
Boards	0	0	0	0	*	0	0	0
Wall Paneling								
Plywood	98	*	0	0	*	0	0	*
Hardboard	2	0	0	0	0	0	0	0
Cabinets								
Plywood	100	*	*	0	*	*	*	*
Boards	0	0	*	0	0	0	0	0
Hardboard	0	0	0	0	0	*	*	0
Other (shelving)								
Plywood	*	0	0	0	0	*	0	0

*This material was identified as being used for this purpose by at least one firm in this location but fewer than 4 firms indicated that they used any material for this application.

Table 25. Average number of houses completed and value of sales for SINGLE FAMILY HOME BUILDERS, by location, Denver Trade Area, 1969.

Location	No. houses built per firm	Value of Sales Classification: Up to $25,000	25,000-49,999	50,000-99,999	100,000-199,999	200,000-499,999	500,000-999,999	Over 1,000,000	Unclassified	Total No. Firms
		No. of firms in sample								
Denver	56*	0	0	0	6	12	6	8	0	32
Colo. Springs	79	0	0	0	2	2	0	6	0	10
Pueblo	13	0	0	0	1	1	1	0	0	3
Boulder	20	0	0	1	1	1	2	1	1	7
Colo. (gen.)	37	0	1	4	5	7	1	2	2	22
Albuquerque	73	0	0	0	0	1	1	2	0	4
N. Mex. (gen.)	19	0	0	2	2	3	2	0	0	9
Wyoming	40	0	3	0	0	4	0	1	0	8
Total No. houses built by all firms in sample	4,329									95
No. firms each classification		0	4	7	17	31	13	20	3	

*One firm built 1000 houses and another built 2000 houses during the year.

Table 26. Softwood plywood used in multi-family housing construction by location and thickness, Denver trade area, 1969. (Figures in thousands of square feet.)

Location	No. of Firms Interviewed	Softwood Plywood Thickness 1/4	3/8	1/2	5/8	3/4	Total Amount Used	Total Amount (3/8" basis)	% of Total (3/8" basis)
Denver	8	--	18	828	296	58	1,200	1,631	44.5
Colorado Springs	3	--	3	533	76	8	620	857	23.4
Pueblo	--	--	--	--	--	--	--	--	--
Boulder	2	--	29	224	67	--	320	440	12.0
Colorado (Misc.)	4	2	6	95	80	36	219	339	9.3
Albuquerque	1	--	--	173	--	--	173	231	6.3
New Mexico (Misc.)	--	--	--	--	--	--	--	--	--
Wyoming	2	--	6	27	26	40	99	165	4.5
Totals	20	2	62	1,880	545	142	2,631	3,663	100.0
% of Total		0.1	2.4	71.4	20.7	5.4			

Table 27. Hardwood plywood used in multi-family housing construction by location and thickness, Denver trade area, 1969. (Figures in thousands of square feet.)

Location	No. of Firms Interviewed	Hardwood Plywood Thickness 1/4	3/8	1/2	5/8	3/4	Other	Total Amount Used	Total Amount (3/8" basis)	% of Total (3/8" basis)
Denver	8	44	--	--	--	11	--	55	51	56.0
Colorado Springs	3	--	--	--	3	--	--	3	5	5.5
Pueblo	--	--	--	--	--	--	--	--	--	--
Boulder	2	9	--	--	--	--	--	9	6	6.6
Colorado (Misc.)	4	4	--	--	--	13	--	17	29	31.9
Albuquerque	1	--	--	--	--	--	--	--	--	--
New Mexico (Misc.)	--	--	--	--	--	--	--	--	--	--
Wyoming	2	--	--	--	--	--	--	--	--	--
Totals	20	57	--	--	3	24	--	84	91	100.0
% of Total		67.8	--	--	3.6	28.6	--			

Table 28. Sources of plywood used in multi-family housing construction, Denver trade area, 1969.

	Softwood Plywood Sources					Hardwood Plywood Sources				
	Wholesale Dealer		Retail Dealer			Wholesale Dealer		Retail Dealer		
Location	Amount*	%	Amount*	%	Total*	Amount*	%	Amount*	%	Total*
Denver	552	46.0	648	54.0	1,200	--	--	55	100	55
Colorado Springs	--	--	620	100	620	--	--	3	100	3
Pueblo	--	--	--	--	--	--	--	--	--	--
Boulder	--	--	320	100	320	--	--	9	100	9
Colorado (Misc.)	--	--	219	100	219	--	--	17	100	17
Albuquerque	--	--	173	100	173	--	--	--	--	--
New Mexico (Misc.)	--	--	--	--	--	--	--	--	--	--
Wyoming	9	9.1	80	80.8	99[a]	--	--	--	--	--
Totals	561	21.3	2,060	78.3	2,631[a]	--	--	84	100	84

*Thousands of square feet, surface measure

[a]These totals include the amounts of plywood imported into the study area from sources outside the study area and hence not accounted for in this source classification.

Table 29. Softwood plywood applications in multi-family housing construction, Denver trade area, 1969.

Location	Type of Application										
	Roof Sheathing	Wall Sheathing	Siding	Soffit	Sub-Flooring	Floor Under-Layment	Concrete Formwork	Wall Paneling	Cabinets	Other	Total
	Thousands of square feet										
Denver	453	20	46	10	408	43	13	--	207	--	1,200
Colorado Springs	113	--	--	--	499	--	8	--	--	--	620
Pueblo	--	--	--	--	--	--	--	--	--	--	--
Boulder	122	--	76	--	122	--	--	--	--	--	320
Colorado (Misc.)	90	3	--	8	83	35	--	--	--	--	219
Albuquerque	86	--	--	--	87	--	--	--	--	--	173
New Mexico (Misc.)	--	--	--	--	--	--	--	--	--	--	--
Wyoming	38	16	5	--	32	4	--	--	4	--	99
Totals	902	39	127	18	1,231	82	21	--	211	--	2,631
% of Total	34.3	1.5	4.8	0.7	46.8	3.1	0.8	--	8.0	--	100.0

Table 30. Hardwood plywood applications in multi-family housing construction, Denver trade area, 1969. (Figures in thousands of square feet, surface measure.)

Location	Type of Application: Finish Flooring	Wall Paneling	Siding	Cabinets & Shelving	Other	Total
Denver	1	25	--	29	--	55
Colorado Springs	--	1	--	2	--	3
Pueblo	--	--	--	--	--	--
Boulder	--	9	--	--	--	9
Colorado (Misc.)	--	4	--	13	--	17
Albuquerque	--	--	--	--	--	--
New Mexico (Misc.)	--	--	--	--	--	--
Wyoming	--	--	--	--	--	--
Totals	1	39	--	44	--	84
% of Total	1.2	46.4	--	52.4	--	100.0

Table 31. Amounts and percentages of plywood used for new construction and remodeling in multi family housing construction, Denver trade area, 1969.

Location	Softwood Plywood Usage					Hardwood Plywood Usage				
	New Construction		Remodeling			New Construction		Remodeling		
	Amount*	%	Amount*	%	Total*	Amount*	%	Amount*	%	Total*
Denver	1,200	100.0	--	--	1,200	55	100.0	--	--	55
Colorado Springs	568	91.6	52	8.4	620	2	66.7	1	33.3	3
Pueblo	--	--	--	--	--	--	--	--	--	--
Boulder	320	100.0	--	--	320	9	100.0	--	--	9
Colorado (Misc.)	215	98.2	4	1.8	219	16	94.1	1	5.9	17
Albuquerque	173	100.0	--	--	173	--	--	--	--	--
New Mexico (Misc.)	--	--	--	--	--	--	--	--	--	--
Wyoming	83	83.8	16	16.2	99	--	--	--	--	--
Totals	2,559	97.3	72	2.7	2,631	82	97.6	2	2.4	84

*Thousands of square feet, surface measure

Table 32. Average market share held by plywood and competing products for selected uses in APARTMENTS, Denver Trade Area, 1969.

Use and Product	Location							
	Denver	Colo. Spgs.	Pueblo	Boulder	Colo. (Gen.)	Albuquerque	N. Mex. (Gen.)	Wyo.
	Percent							
Roof Sheathing								
Plywood	100	*	0	*	*	0	0	*
2 x 6 boards	0	0	0	*	0	0	0	0
Hardboard	0	0	0	0	0	0	0	*
Wall sheathing								
Plywood	*	0	0	0	*	0	0	*
Fiber board	0	0	0	0	0	0	0	*
Siding								
Plywood	*	0	0	*	0	0	0	*
Shingles	0	0	0	*	0	0	0	0
Soffits								
Plywood	0	0	0	*	0	0	0	*
Asbestos	*	0	0	0	0	0	0	0
Drywall	*	0	0	0	0	0	0	0
Subflooring								
Plywood	85	*	0	*	*	0	0	*
Particleboard	8	0	0	0	0	0	0	*
Concrete	8	*	0	0	0	0	0	0
Floor Underlayment								
Plywood	*	0	0	0	*	0	0	0
Particleboard								
Concrete Form Work								
Plywood	*	0	0	0	0	0	0	0
Wall paneling								
Plywood	*	0	0	0	0	0	0	0
Cabinets								
Plywood	*	0	0	0	*	0	0	0
Particleboard	*	0	0	0	0	0	0	0
Other (shelving)								
Plywood	*	0	0	0	0	0	0	0

Table No. 33. Average number of APARTMENTS built and value of this construction by location, Denver Trade Area, 1969.

Location	Average no. garden	Average no. high-rise apts.	Value of construction: Up to $50,000	50,000-99,999	100,000-199,999	200,000-499,999	500,000-999,999	Over $1,000,000	Total no. firms
			No. firms						
Denver	39	500*	0	0	0	0	2	4	6
Colo. Springs	318	75*	0	0	0	0	0	3	3
Pueblo	0	0	0	0	0	0	0	0	0
Boulder	52	0	0	0	0	0	0	1	1
Colo. (gen.)	54	0	0	0	0	2	1	1	4
Albuquerque	150*	0	0	0	0	0	0	1	1
N. Mex. (gen.)	0	0	0	0	0	0	0	0	0
Wyoming	26	0	0	1	0	0	0	1	2
Total no. apt. units built by sample firms	1,428	575							
No. Firms each class				1	0	2	3	11	17

*1 Firm

Table 34. Softwood plywood used in non-residential construction by location and thickness, Denver trade area, 1969.

Location	No. of Firms Interviewed	1/4	3/8	1/2	5/8	3/4	Other	Total Amount Used	Total Amount (3/8" basis)	% of Total (3/8" basis)
		Thousands of square feet								
Denver	22	19	82	214	194	719	10	1,238	2,171	22.2
Colorado Springs	5	--	12	15	38	163	--	228	421	4.3
Pueblo	3	--	--	232	145	127	--	504	805	8.2
Boulder	1	--	--	7	3	3	--	13	20	0.2
Colorado (Misc.)	14	1	7	273	249	183	--	713	1,152	11.8
Albuquerque	16	--	205	272	288	970	126	1,861	3,267	33.5
New Mexico (Misc.)	9	--	4	111	199	247	--	561	978	10.0
Wyoming	12	38	48	250	150	123	20	629	962	9.8
Totals	82	58	358	1,374	1,266	2,535	156	5,747	9,776	100.0
% of Total		1.0	6.2	23.9	22.0	44.2	2.7			

Table 35. Hardwood plywood used in non-residential construction by location and thickness, Denver trade area, 1969.

Location	No. of Firms Interviewed	1/4	3/8	1/2	5/8	3/4	Other	Total Amount Used	Total Amount (3/8" basis)	% of Total (3/8" basis)
		Thousands of square feet								
Denver	22	61	5	3	--	66	27	162	236	13.0
Colorado Springs	5	17	10	--	--	1	--	28	23	1.3
Pueblo	3	--	--	--	--	--	6	6	3	0.2
Boulder	1	2	--	--	--	1	--	3	3	0.2
Colorado (Misc.)	14	20	--	4	--	12	--	36	42	2.3
Albuquerque	16	301	--	35	195	390	--	921	1,353	74.3
New Mexico (Misc.)	9	12	1	--	--	4	3	20	18	0.9
Wyoming	12	9	--	2	2	65	1	79	142	7.8
Totals	82	422	16	44	197	539	37	1,255	1,820	100.0
% of Total		33.6	1.4	3.5	15.7	42.9	2.9			

Table 36. Sources of plywood used in non-residential construction, Denver trade area, 1969.

	Softwood Plywood Sources					Hardwood Plywood Sources				
	Wholesale Dealer		Retail Dealer			Wholesale Dealer		Retail Dealer		
Location	Amount*	%	Amount*	%	Total*	Amount*	%	Amount*	%	Total*
Denver	485	39.2	709	57.3	1,238[a]	83	51.2	78	48.1	162[a]
Colorado Springs	--	--	228	100.0	228	--	--	28	100.0	28
Pueblo	215	42.7	289	57.3	504	4	66.7	2	33.3	6
Boulder	--	--	13	100.0	13	--	--	3	100.0	3
Colorado (Misc.)	106	14.9	603	84.6	713[a]	8	22.2	28	77.8	36
Albuquerque	695	37.3	1,166	62.7	1,861	815	88.5	106	11.5	921
New Mexico (Misc.)	113	20.1	448	79.9	561	2	10.0	18	90.0	20
Wyoming	365	58.0	161	25.6	629[a]	72	91.1	7	8.9	79
Totals	1,979	34.4	3,617	62.9	5,747	984	78.4	270	21.5	1,255[a]

*Thousands of square feet, surface measure.

[a]These totals include the amounts of plywood imported into the study area from sources outside the study area and hence not accounted for in this source classification.

Table 37. Softwood plywood applications in non-residential construction, Denver trade area, 1969.

Location	Type of Application										
	Roof Sheathing	Wall Sheathing	Siding	Soffit	Sub-Flooring	Floor Under-Layment	Concrete Formwork	Wall Paneling	Cabinets	Other	Total
	Thousands of square feet										
Denver	164	88	--	9	130	69	731	5	35	7	1,238
Colorado Springs	17	--	5	10	64	--	132	--	--	--	228
Pueblo	218	54	82	--	118	--	32	--	--	--	504
Boulder	10	--	--	--	2	--	1	--	--	--	13
Colorado (Misc.)	270	--	52	11	277	--	96	--	7	--	713
Albuquerque	554	86	--	73	198	--	946	1	--	3	1,861
New Mexico (Misc.)	120	--	--	3	87	--	331	13	7	--	561
Wyoming	230	11	52	32	48	160	68	--	28	--	629
Totals	1,583	239	191	138	924	229	2,337	19	77	10	5,747
% of Total	27.5	4.2	3.3	2.4	16.1	4.0	40.7	0.3	1.3	0.2	100.0

Table 38. Hardwood plywood applications in non-residential construction, Denver trade area, 1969.

Location	Type of Application: Finish Flooring	Wall Paneling	Siding	Cabinets & Shelving	Other	Total
	Thousands of square feet					
Denver	--	95	--	67	--	162
Colorado Springs	--	27	1	--	--	28
Pueblo	--	6	--	--	--	6
Boulder	--	2	--	1	--	3
Colorado (Misc.)	--	21	3	12	--	36
Albuquerque	--	130	42	748	1	921
New Mexico (Misc.)	--	14	--	5	1	20
Wyoming	2	12	--	65	--	79
Totals	2	307	46	898	2	1,255
% of Total	0.1	24.5	3.7	71.6	0.1	100.0

Table 39. Amounts and percentages of plywood used for new construction and remodeling in non-residential construction, Denver trade area, 1969.

	Softwood Plywood Usage					Hardwood Plywood Usage				
	New Construction		Remodeling			New Construction		Remodeling		
Location	Amount*	%	Amount*	%	Total*	Amount*	%	Amount*	%	Total*
Denver	1,083	87.5	155	12.5	1,238	123	75.9	39	24.1	162
Colorado Springs	167	73.2	61	26.8	228	24	85.7	4	14.3	28
Pueblo	504	100.0	--	--	504	6	100.0	--	--	6
Boulder	6	46.2	7	53.8	13	2	66.7	1	33.3	3
Colorado (Misc.)	686	96.2	27	3.8	713	32	88.9	4	11.1	36
Albuquerque	1,709	91.8	152	8.2	1,861	900	97.7	21	2.3	921
New Mexico (Misc.)	456	81.3	105	18.7	561	16	80.0	4	20.0	20
Wyoming	622	98.9	7	1.1	629	73	92.4	6	7.6	79
Totals	5,233	91.1	514	8.9	5,747	1,176	93.7	79	6.3	1,255

*Thousands of square feet, surface measure.

Table 40. Average market share held by plywood and competing products for selected uses in NON-RESIDENTIAL CONSTRUCTION, Denver Trade Area, 1969

Use and Material	Location							
	Denver	Colo. Spgs.	Pueblo	Boulder	Colo. (Gen.)	Albuquerque	N. Mex. (Gen.)	Wyo.
	Percent							
Roof Sheathing								
Plywood	97	*	*	*	96	95	74	99
Concrete	2	0	0	0	0	0	0	0
Metal	1	0	*	*	1	0	0	1
Boards (decking)	0	0	*	0	3	5	26	0
Wall Sheathing								
Plywood	100	0	*	0	0	*	0	78
Fiberboard	0	0	0	0	0	0	0	22
Siding								
Plywood	0	*	*	0	*	*	0	0
Hardboard	0	*	0	0	*	0	0	0
Soffit								
Plywood	*	*	0	0	*	94	0	*
Handboard	0	0	0	0	0	6	0	*
Subflooring								
Plywood	100	*	*	0	69	84	76	78
Hardboard	0	*	0	0	16	16	0	4
Concrete	0	0	0	0	3	0	12	18
Other	0	0	0	0	12	0	0	0
Boards	0	0	0	0	0	0	12	0
Floor Underlayment								
Plywood	97	0	0	0	0	0	0	*
Hardboard	3	0	0	0	0	0	0	0
Concrete Formwork								
Plywood	94	*	0	0	99	99	98	*
Metal	5	0	0	0	1	1	2	0
Boards	1	0	*	0	0	0	0	0
Hardboard	0	*	0	0	0	0	0	0
Wall paneling								
Plywood	92	0	0	*	*	100	0	0
Hardboard	2	0	0	0	0	0	0	0
Sheetrock	6	0	0	0	0	0	0	0
Cabinets								
Plywood	98	*	0	*	73	*	0	*
Hardboard	2	*	0	0	20	0	0	*
Formica	0	0	0	0	7	0	0	0

Table 41. Number of construction projects by NON-RESIDENTIAL contractors and value of construction by location, Denver Trade Area, 1969.

Location	Average No. Projects Building	Non-Bldg.	Up to $99,999	100,000-199,999	200,000-499,999	500,000-999,999	Over $1,000,000	Unclassified	Total No. Firms
Denver	40*	13	0	2	4	2	11	0	19
Colo. Springs	39	0	0	0	0	2	3	0	5
Pueblo	4	0	0	0	0	0	3	0	3
Boulder	6**	0	0	0	0	1	0	0	1
Colo. (gen.)	8	6	0	0	2	4	6	0	12
Albuquerque	12	9	0	2	2	1	8	1	14
N. Mex. (gen.)	42*	9	0	0	2	4	3	0	9
Wyoming	6	4	1	2	3	3	3	0	12
No. Projects	1,352	202							
No firms each category			1	6	13	17	37	1	75

Table 42. Number and percent of detailed questionnaires completed with manufacturers using plywood, Denver trade area, 1969.

Location	Total Number Firms Using Plywood	In-Depth Interviews Completed	Percent of Total Firms
Denver	146	14	9.6
Colorado Springs	37	7	18.9
Pueblo	4	1	25.0
Boulder	11	3	27.2
Colorado (General)	87	26	29.9
Wyoming	31	5	12.9
Albuquerque	63	7	11.1
New Mexico (General)	48	4	8.3
Arizona/Kansas/Utah	1	0	--
Total	428	67	15.7

Table 43. Amounts and percentage shares of softwood plywood used in manufacturing, Denver trade area, 1969.

Type of Manufacturing Operation	Number of Firms	% of Total	Softwood Plywood Thickness 1/4	3/8	1/2	5/8	3/4	Total Amount Used	Total Amount Used (3/8" Basis)	% of Total (3/8" Basis
			Thousands of square feet							
Cabinets, Fixtures and General Millwork	43	64.2	151	350	212	111	265	1,089	1,452	25.6
Campers, Pick-up Tops and Recreational Vehicles	13	19.4	170	55	525	693	42	1,485	1,876	33.1
Furniture	6	9.0	58	--	23	45	65	191	275	4.8
Mobile Homes	3	4.5	195	112	12	284	--	603	731	12.9
Other	2	2.9	600	--	75	37	388	1,100	1,338	23.6
Total*	67	100.0	1,174 (26.3)	517 (11.6)	847 (18.9)	1,170 (26.2)	760	4,468 (100.0)	5,672	100.0

*Figures in parentheses denote the percentage shares of the total softwood plywood usage in each thickness.

Table 44. Amounts and percentage shares of hardwood plywood used in manufacturing, Denver trade area, 1969.

Type of Manufacturing Operation	Number of Firms	% of Total	Hardwood Plywood Thickness 1/4	3/8	1/2	5/8	3/4	Prefinished Panelling	Total Amt. Used	Total Amt. Used (3/8" basis)	% of Total (3/8" basis)
			Thousands of square feet								
Cabinets, Fixtures and General Millwork	43	64.2	94	134	27	--	570	--	825	1,365	17.2
Campers, Pick-up Tops and Recreational Vehicles	13	19.4	43	7	--	--	549	7,469	8,068	4,919	62.1
Furniture	6	9.0	60	--	1	--	307	--	368	645	8.1
Mobile Homes	3	4.5	144	28	--	--	--	1,741	1,913	995	12.6
Other	2	2.9	--	--	--	--	--	--	--	--	--
Total*	67	100.0	341 (3.0)	169 (1.5)	28 (0.2)	-- (--)	1,426 (12.8)	9,210 (82.5)	11,164 (100.0)	7,924	100.0

*Figures in parentheses denote the percentage shares of the total hardwood plywood usage in each thickness.

Table 45. Purposes for which softwood plywood was used by manufacturers, Denver trade area, 1969.

Softwood Plywood Usage	Type of Manufacturing Operation: Cabinets, Fixtures, &General Millwork Amount*	% of Total*	Campers, Pick-Up Tops, &Recreational Vehicles Amount*	% of Total	Furniture Amount*	% of Total	Mobile Homes Amount*	% of Total	Other Amount*	% of Total	Total Amount For Each Usage*	% of Total For Each Usage
Products Made for Sale	1,371	94.4 (24.9)	1,793	95.6 (32.5)	275	100.0 (5.0)	731	100.0 (13.3)	1,338	100.0 (24.3)	5,508 (100)	97.1
General Construction Activities	71	4.9 (100.0)	none	-- (--)	none	-- (--)	none	-- (--)	none	-- (--)	71 (100)	1.3
Products for Own Use	10	0.7 (10.8)	83	4.4 (89.2)	none	-- (--)	none	-- (--)	none	-- (--)	93 (100)	1.6
Totals	1,452	100.0	1,876	100.0	275	100.0	731	100.0	1,338	100.0	5,672	100.0

*Thousands of square feet, 3/8 inch basis
**Percentages in parentheses are calculated on row totals.

Table 46. Purposes for which hardwood plywood was used by manufacturers, Denver trade area, 1969.

Hardwood Plywood Usage	Type of Manufacturing Operation: Cabinets, Fixtures, &General Millwork Amount*	% of Total**	Campers, Pick-Up Tops, &Recreational Vehicles Amount*	% of Total	Furniture Amount*	% of Total	Mobile Homes Amount*	% of Total	Other Amount*	% of Total	Total Amount For Each Usage*	% of Total For Each Usage
Products Made for Sale	1,336	97.9 (16.9)	4,919	100.0 (62.3)	645	100.0 (8.2)	995	100.0 (12.6)	none	-- (--)	7,895 (100)	99.6
General Construction Activities	26	1.9 (100.0)	none	-- (--)	none	-- (--)	none	-- (--)	none	-- (--)	26 (100)	0.3
Products for Own Use	3	0.2 (100.0)	none	-- (--)	none	-- (--)	none	-- (--)	none	-- (--)	3 (100)	0.1
Totals	1,365	100.0	4,919	100.0	645	100.0	995	100.0	--	--	7,924	100.0

*Thousands of square feet, 3/8 inch basis.
**Percentages in parentheses are calculated on row totals.

Table 47. Sources of softwood plywood used in manufacturing operations, Denver trade area, 1969.

Sources	Type of Manufacturing Operation: Cabinets, Fixtures, & General Millwork — Amount*	% of Total**	Campers, Pick-Up Tops, & Recreational Vehicles — Amount*	% of Total	Furniture — Amount*	% of Total	Mobile Homes — Amount*	% of Total	Other — Amount*	% of Total	Total Amount From Each Source*	% of Total From Each Source
From Mills:												
Within Study Area	none	-- (--)	none	-- (--)	none	-- (--)	none	-- (--)	882	65.9 (100.0)	882 (100)	15.6
Outside Study Area	none	-- (--)	none	-- (--)	none	-- (--)	none	-- (--)	none	-- (--)	none (--)	--
From Wholesale Dealers:												
Within Study Area	1,356	93.4 (32.6)	1,838	98.0 (44.2)	275	100.0 (6.6)	232	31.8 (5.6)	456	34.1 (11.0)	4,157 (100)	73.3
Outside Study Area	6	0.2 (1.1)	34	1.8 (6.3)	none	-- (--)	499	68.2 (92.6)	none	-- (--)	539 (100)	9.5
From Retail Dealers:												
Within Study Area	90	6.2 (95.7)	4	(0.2) (4.3)	none	-- (--)	none	-- (--)	none	-- (--)	94 (100)	1.6
Outside Study Area	none	-- (--)	none	-- (--)	none	-- (--)	none	-- (--)	none	-- (--)	none (--)	--
Totals	1,452	100.0	1,876	100.0	275	100.0	731	100.0	1,338	100.0	5,672	100.0

*Thousands of square feet, 3/8 inch basis.
**Percentages in parentheses are calculated on row totals.

Table 48. Sources of hardwood plywood used in manufacturing operations, Denver trade area, 1969.

Sources	Type of Manufacturing Operation: Cabinets, Fixtures, & General Millwork — Amount	% of Total*	Campers, Pick-Up Tops, & Recreational Vehicles — Amount	% of Total	Furniture — Amount	% of Total	Mobile Homes — Amount	% of Total	Other — Amount	% of Total	Total Amount From Each Source	% of Total From Each Source
From Mills:												
Within Study Area	none	-- (--)	none	-- (--)	none	-- (--)	none	-- (--)	none	-- (--)	none (--)	--
Outside Study Area	none	-- (--)	3,006	61.1 (87.3)	439	68.0 (12.7)	none	-- (--)	none	-- (--)	3,445 (100)	43.5
From Wholesale Dealers:												
Within Study Area	1,132	82.9 (28.1)	1,859	37.8 (46.1)	206	(32.0) (5.1)	832	83.6 (20.7)	none	-- (--)	4,029 (100)	50.8
Outside Study Area	196	14.4 (48.6)	44	0.9 (10.9)	none	-- (--)	163	16.4 (40.5)	none	-- (--)	403 (100)	5.1
From Retail Dealers:												
Within Study Area	37	2.7 (78.7)	10	0.2 (21.3)	none	-- (--)	none	-- (--)	none	-- (--)	47 (100)	0.6
Outside Study Area	none	-- (--)	none	-- (--)	none	-- (--)	none	-- (--)	none	-- (--)	none (--)	--
Totals	1,365	100.0	4,919	100.0	645	100.0	995	100.0	none	--	7,924	100.0

*Thousands of square feet, 3/8 inch basis.
**Percentages in parentheses are calculated on row totals.

Table 49. Most frequently used species of hardwood plywood by manufacturers, Denver trade area, 1969.

Type of Manufacturing Operation	Frequency of Mention as Species Most Often Used					
	Birch	Ash	Walnut	Oak	Mahogany	Luan
Cabinets, Fixtures and General Millwork	29	2	3	3	2	2
Campers, Pick-up Tops and Recreational Vehicles	2	2	none	none	3	5
Furniture	2	none	none	2	1	none
Mobile Homes	none	none	none	none	1	2
Other	none	none	none	none	none	none
Total	33	4	3	5	7	9

APPENDIX II

Questionnaires

Manufacturing

Budget Bureau No. 40-S68111

Approval Expires: June 30, 1969

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

MAIN OFFICE
240 WEST PROSPECT STREET
FORT COLLINS, COLORADO 80521

IN REPLY REFER TO

(Please correct address as necessary.)

Gentlemen:

In cooperation with Colorado State University and the plywood industry, we are analyzing plywood use patterns in your locality. Our goal is to help make plywood better serve the needs of its users.

Industry directories indicate that your firm may use or distribute a significant amount of plywood. We therefore request that you answer the questions that follow this letter. It should take only a few minutes, but your answers will be very important to the overall value of this study.

Replies will be kept strictly confidential. In reporting, they will be combined with answers from others so that no information about your individual business will be disclosed or published.

Please return the form in the self-addressed envelope provided at your earliest convenience, even if you do not use plywood.

Sincerely yours,

RAYMOND PRICE, Director

---

1. DID YOUR FIRM USE ANY PLYWOOD IN ANY OF ITS ACTIVITIES IN 1968? (IF YOUR FIRM HAS SEVERAL UNITS, PLEASE REPLY ONLY FOR THE ESTABLISHMENT AT THE ABOVE ADDRESS. OTHER ESTABLISHMENTS IN YOUR COMPANY, IF ANY, WILL RECEIVE SEPARATE FORMS.)

   ☐ Yes If yes, please complete questions 2 and 3.

   ☐ No If no, please return this form in the enclosed envelope, which needs no stamp. Further answers are not required.

2. APPROXIMATELY HOW MUCH PLYWOOD DID YOUR ESTABLISHMENT USE IN 1968?

	No. of 4'x 8' sheets	*or*	*Square feet*
Softwood plywood	_____		_____
Hardwood plywood	_____		_____

3. APPROXIMATELY WHAT PERCENT OF THE TOTAL QUANTITY USED WAS USED IN EACH OF THE FOLLOWING:

	Percent
Products or systems manufactured for sale	_____
Packaging and materials handling for your own production . . .	_____
Maintenance of your own facilities	_____
Other (specify) _____	_____
_____	_____
Total . . .	100

Thank you for your time. Please return the questionnaire in the enclosed envelope, which needs no stamp. Your reply is important, even if you used no plywood.

Reported by: _____ Date _____

Telephone No._____

Distributors

Budget Bureau No. 40-S68111

Approval Expires: June 30, 1969

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

MAIN OFFICE
240 WEST PROSPECT STREET
FORT COLLINS, COLORADO 80521

IN REPLY REFER TO

(Please correct address as necessary.)

Gentlemen:

In cooperation with Colorado State University and the plywood industry, we are analyzing plywood use patterns in your locality. Our goal is to help make plywood better serve the needs of its users.

Industry directories indicate that your firm may use or distribute a significant amount of plywood. We therefore request that you answer the questions that follow this letter. It should take only a few minutes, but your answers will be very important to the overall value of this study.

Replies will be kept strictly confidential. In reporting, they will be combined with answers from others so that no information about your individual business will be disclosed or published.

Please return the form in the self-addressed envelope provided at your earliest convenience, even if you do not use plywood.

Sincerely yours,

RAYMOND PRICE, Director

---

1. DID YOUR FIRM SELL, DISTRIBUTE, OR USE PLYWOOD IN 1968? (IF YOUR FIRM HAS SEVERAL UNITS, PLEASE REPLY ONLY FOR THE ESTABLISHMENT AT THE ABOVE ADDRESS. OTHER ESTABLISHMENTS IN YOUR COMPANY, IF ANY, WILL RECEIVE SEPARATE FORMS.)

☐ Yes If yes, please turn to question 2.

☐ No If no, please return this form in the enclosed envelope, which needs no stamp. Further answers are not required.

2. APPROXIMATELY HOW MUCH PLYWOOD DID YOUR ESTABLISHMENT SELL OR DISTRIBUTE IN 1968?

	No. of 4'x 8' sheets	*or*	*Square feet*
Softwood plywood	_____		_____
Hardwood plywood	_____		_____

3. DID YOUR ESTABLISHMENT USE PLYWOOD IN OTHER ACTIVITIES IN 1968?

☐ Yes If yes, please complete questions 4, 5, 6, and 7.

☐ No If no, please return this form in the enclosed envelope, which needs no stamp. Further answers are not required.

4. APPROXIMATELY HOW MUCH PLYWOOD WAS USED BY YOUR ESTABLISHMENT IN 1968?

	No. of 4'x 8' sheets	*or*	*Square feet*
Softwood plywood	_____		_____
Hardwood plywood	_____		_____

5. APPROXIMATELY WHAT PERCENT OF THE TOTAL QUANTITY USED WAS USED IN:

	Percent
Building or construction	_____
Products or systems manufactured for sale	_____
Packaging or materials handling for your own production . . .	_____
Maintenance of your own facilities	_____
Other (specify) _____	_____
Total	100

6. APPROXIMATELY WHAT PERCENT OF THE TOTAL PLYWOOD USED IN BUILDING OR CONSTRUCTION IN 1968 WAS USED FOR NEW CONSTRUCTION AND FOR REMODELING IN EACH OF THESE CLASSES:

	Percent used in new construction	*Percent used in remodeling or repair*
Single-family houses (includes town houses) . .	_____	_____
Garden apartments (4 stories or less)	_____	_____
High-rise apartments (5 stories or more) . . .	_____	_____
Nonresidential construction (industrial and commercial bldgs., bridges, hwys., etc.) . . .	_____	_____
Other (specify) _____	_____	_____
Total	_____ +	_____ = 100

7. CHECK BELOW THE KINDS OF BUILDING ACTIVITY YOUR ESTABLISHMENT ENGAGED IN DURING 1968.

	New construction	*Remodeling or repair*
Prime contracting	☐	☐
Subcontracting	☐	☐

Thank you for your time. Please return the questionnaire in the enclosed envelope, which needs no stamp. Your reply is important, even if you sold or used no plywood.

Reported by: _____ Date _____

Telephone No._____

Building or construction

Budget Bureau No. 40-S68111

Approval Expires: June 30, 1969

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

MAIN OFFICE
240 WEST PROSPECT STREET
FORT COLLINS, COLORADO 80521

IN REPLY REFER TO

(Please correct address as necessary.)

Gentlemen:

In cooperation with Colorado State University and the plywood industry, we are analyzing plywood use patterns in your locality. Our goal is to help make plywood better serve the needs of its users.

Industry directories indicate that your firm may use or distribute a significant amount of plywood. We therefore request that you answer the questions that follow this letter. It should take only a few minutes, but your answers will be very important to the overall value of this study.

Replies will be kept strictly confidential. In reporting, they will be combined with answers from others so that no information about your individual business will be disclosed or published.

Please return the form in the self-addressed envelope provided at your earliest convenience, even if you do not use plywood.

Sincerely yours,

RAYMOND PRICE, Director

---

1. DID YOUR FIRM USE ANY PLYWOOD IN ANY OF ITS ACTIVITIES IN 1968? (IF YOUR FIRM HAS SEVERAL UNITS, PLEASE REPLY ONLY FOR THE ESTABLISHMENT AT THE ABOVE ADDRESS. OTHER ESTABLISHMENTS IN YOUR COMPANY, IF ANY, WILL RECEIVE SEPARATE FORMS.)

☐ Yes If yes, please complete questions 2 through 5.

☐ No If no, please return this form in the enclosed envelope, which needs no stamp. Further answers are not required.

2. APPROXIMATELY HOW MUCH PLYWOOD DID YOUR ESTABLISHMENT USE IN 1968?

	No. of 4'x 8' sheets	*or*	*Square feet*
Softwood plywood	_____		_____
Hardwood plywood	_____		_____

3. APPROXIMATELY WHAT PERCENT OF THE TOTAL QUANTITY USED WAS USED IN EACH OF THE FOLLOWING:

	Percent
Building or construction	_____
Products or systems manufactured for sale	_____
Packaging or materials handling for your own production . . .	_____
Maintenance of your own facilities	_____
Other (specify) _____	_____
Total	100

4. APPROXIMATELY WHAT PERCENT OF THE TOTAL PLYWOOD USED IN BUILDING OR CONSTRUCTION IN 1968 WAS USED FOR NEW CONSTRUCTION AND FOR REMODELING IN EACH OF THESE CLASSES:

	Percent used in new construction		*Percent used in remodeling or repair*	
Single-family houses (includes town houses) . .	_____		_____	
Garden apartments (4 stories or less)	_____		_____	
High-rise apartments (5 stories or more) . . .	_____		_____	
Nonresidential construction (industrial and commercial bldgs., bridges, hwys., etc.) . . .	_____		_____	
Other (specify) _____	_____		_____	
Total	_____	+	_____	= 100

5. CHECK BELOW THE KINDS OF BUILDING ACTIVITY YOUR ESTABLISHMENT ENGAGED IN DURING 1968.

	New construction	*Remodeling or repair*
Prime contracting	☐	☐
Subcontracting	☐	☐

Thank you for your time. Please return the questionnaire in the enclosed envelope, which needs no stamp. Your reply is important, even if you used no plywood.

Reported by: _____ Date _____

Telephone No._____

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

MAIN OFFICE
240 WEST PROSPECT STREET
FORT COLLINS, COLORADO 80521

IN REPLY REFER TO

April, 1969

Gentlemen:

Recently we mailed questionnaires to several firms, including yours, asking for information about plywood used or distributed. Since we have not received your reply, our letter possibly went astray or escaped your attention.

Another questionnaire like the first is enclosed. Whether or not you use or distribute plywood, we would greatly appreciate it if you can find a few minutes to fill out this brief questionnaire and return it in the next day or two.

Your firm is one of a selected group from which we are soliciting information for our analysis of plywood useage in your region. If you are a plywood user or distributor, we believe you will benefit directly, in terms of products that can better serve your needs, by returning the questionnaire. If you are not a plywood user, your answer to the first question is still important. We trust that you will be willing to check "No" on the enclosed form and return it in the self-addressed envelope.

We and our cooperators at Colorado State University thank you for your help.

Sincerely,

RAYMOND PRICE
Director

Enclosure

DISTRIBUTOR

Bureau of Budget No. 40-S68112

Approval Expires December 31, 1969

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

MAIN OFFICE
240 WEST PROSPECT STREET
FORT COLLINS, COLORADO 80521

IN REPLY REFER TO
4830

April, 1969

Gentlemen:

We again need your help in obtaining plywood information. Your reply to our preliminary inquiry a few weeks ago helped us identify plywood users and distributors in your area. Now, we are asking a selected group of firms to provide further facts by answering the questions that follow this letter.

This information on current and prospective markets for plywood is needed in evaluating the adequacy of the nation's timber management programs and, especially, in projecting probable future needs for veneer quality timber to meet the requirements of this market.

We hope you will find the few minutes necessary to answer these questions and return this booklet promptly in the enclosed self-addressed envelope (no stamp needed). Your answers are especially important since you are one of a limited number of firms chosen to represent your particular kind of business.

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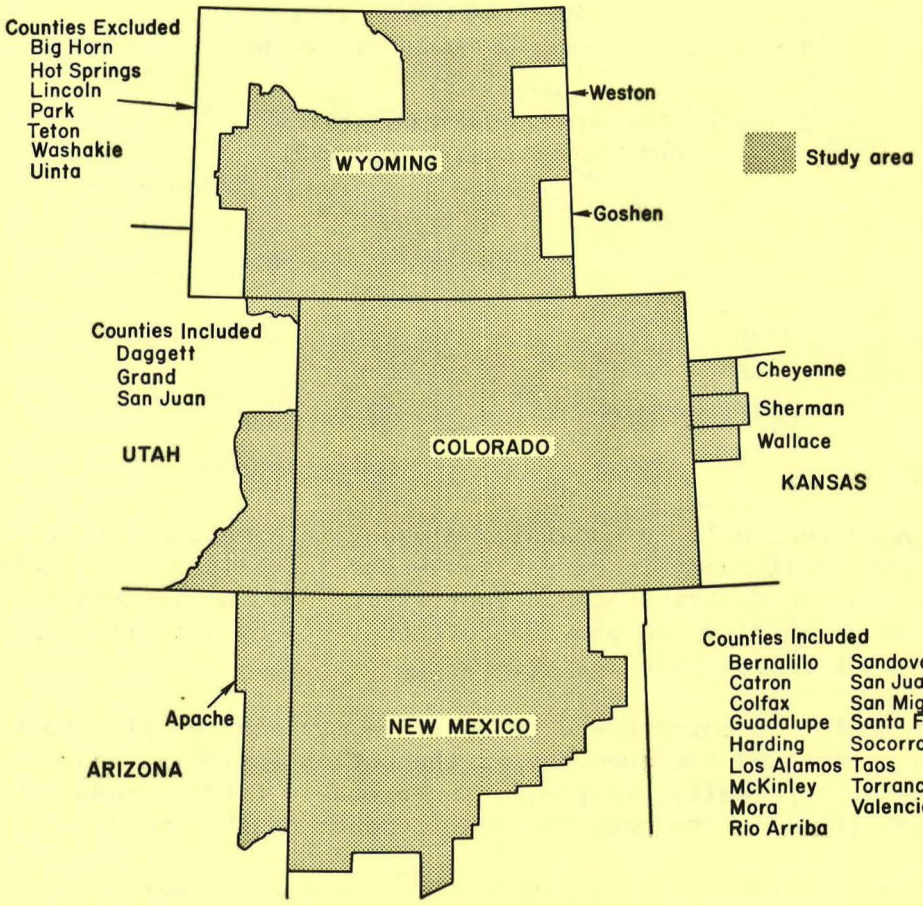
Sincerely yours,

Raymond Price

RAYMOND PRICE
Director

Enclosure

DENVER PLYWOOD MARKET STUDY AREA



INSTRUCTIONS

Plywood to report

Report only the plywood bought, sold, or used in the Study Area by the establishment shown in the address. (If there is more than one establishment in your firm, each will be asked to report separately.)

Do not report plywood used by subcontractors who worked for you, plywood used in manufactured components you bought, or plywood you used outside the Study Area. (Refer to the map above for Study Area boundaries.)

Plywood volume

Reporting plywood volumes in square feet of surface area is preferable, but provision is made to report number of sheets.

If sheets are the unit used, please give the length and width in feet; for example, 4 x 8, 4 x 9, 3 x 9, etc. To convert number of sheets to square feet, multiply the surface area by the number of sheets. Example: A 4 x 8 sheet has 32 square feet of surface area; therefore, ten 4 x 8 sheets (32 square feet) = 320 square feet of plywood.

Softwood and hardwood classification

The species of the face veneer determines the classification of the plywood. (For example, if the face veneer is a hardwood, classify the plywood as "hardwood plywood" regardless of what species is used for the back veneer or inner plies.)

Classify plywood as "softwood" if it is faced with a "medium density," "high density," or non wood-grain pattern "high pressure" overlay.

Classify the plywood according to the species represented by the overlay if it is faced with a wood-grain printed overlay.

1. DURING 1968, APPROXIMATELY HOW MUCH PLYWOOD WAS BOUGHT BY THIS ESTABLISHMENT?

If you bought no plywood, check None below and turn to question 4.

☐ None

Total softwood plywood bought:

Square feet surface measure _____

or

	Number	*Size*
Sheets	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____

Total hardwood plywood bought:

Square feet surface measure _____

or

	Number	*Size*
Sheets	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____

2. APPROXIMATELY WHAT PERCENT OF THE SOFTWOOD AND HARDWOOD PLYWOOD YOUR ESTABLISHMENT BOUGHT IN 1968 WAS OF EACH THICKNESS LISTED BELOW?

Thickness	*Softwood (Percent of total)*	*Hardwood (Percent of total)*
3/16"	_____%	_____%
1/4"	_____%	_____%
5/16"	_____%	_____%
3/8"	_____%	_____%
1/2"	_____%	_____%
5/8"	_____%	_____%
3/4"	_____%	_____%
Other (specify)		
_____	_____%	_____%
_____	_____%	_____%
TOTAL	100%	100%

3. APPROXIMATELY WHAT PERCENT OF THE SOFTWOOD AND HARDWOOD PLYWOOD YOUR ESTABLISHMENT BOUGHT IN 1968 WAS OBTAINED DIRECTLY FROM EACH OF THE SOURCES LISTED BELOW?

Source	*Softwood (Percent of total)*	*Hardwood (Percent of total)*
Within Study Area:		
Mill	_____%	_____%
Wholesale dealer	_____%	_____%
Retail dealer	_____%	_____%
Importer	_____%	_____%
Other (specify)		
_____	_____%	_____%
Outside Study Area:		
Mill	_____%	_____%
Wholesale dealer	_____%	_____%
Retail dealer	_____%	_____%
Importer	_____%	_____%
Other (specify)		
_____	_____%	_____%
TOTAL	100%	100%

4. DURING 1968, APPROXIMATELY HOW MUCH PLYWOOD WAS SOLD TO OTHERS BY THIS ESTABLISHMENT?

If you sold no plywood, check None below and turn to question 6.

☐ None

Total softwood plywood sold to others:

Square feet surface measure _____

or

	Number	*Size*
Sheets	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____

Total hardwood plywood sold to others:

Square feet surface measure _____

or

	Number	*Size*
Sheets	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____

5. APPROXIMATELY WHAT PERCENT OF THE SOFTWOOD AND HARDWOOD PLYWOOD YOU SOLD TO OTHERS IN 1968 WENT TO THE TYPES OF BUYERS LISTED BELOW, WITHIN AND OUTSIDE THE STUDY AREA?

Destination	*Within Study Area*		*Outside Study Area*	
	Percent of total softwood sold	*Percent of total hardwood sold*	*Percent of total softwood sold*	*Percent of total hardwood sold*
Wholesale or retail building materials dealers	%	%	%	%
Builders, contractors, subcontractors, or self-employed carpenters	%	%	%	%
Industrial users (Manufacturers of furniture, boats, pallets, containers, mobile homes, prefab. structures, railroads, trucklines, etc.)	%	%	%	%
Farmers and ranchers	%	%	%	%
"Do-it-yourself" users	%	%	%	%
Other (specify: for example, Federal, State, and local government, military, etc.)	%	%	%	%
	%	%	%	%
TOTAL	100%	100%	100%	100%

6. DURING 1968, APPROXIMATELY HOW MUCH PLYWOOD WAS USED BY THIS ESTABLISHMENT IN THE STUDY AREA FOR ALL PURPOSES?

If you used no plywood in the Study Area, check None below and turn to question 7.

☐ None

Total softwood plywood used:

Square feet surface measure _____
or

	Number	*Size*
Sheets	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____

Total hardwood plywood used:

Square feet surface measure _____
or

	Number	*Size*
Sheets	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____

Approximately what percent of plywood reported above was used for each of the following purposes?

	Softwood (Percent of total)	*Hardwood (Percent of total)*
Single family houses - on-site construction, remodeling, repair	_____%	_____%
Garden apartments (4 stories or less) construction, remodeling, repair	_____%	_____%
High-rise apartments (5 stories or more) - construction, remodeling, repair	_____%	_____%
Nonresidential buildings - on-site construction, remodeling, repair	_____%	_____%
Construction other than buildings	_____%	_____%
Manufactured homes and buildings	_____%	_____%
Mobile homes	_____%	_____%
TOTAL	100%	100%

7. APPROXIMATELY WHAT PERCENT OF THE TOTAL VALUE OF YOUR BUILDING MATERIALS PURCHASES DID PLYWOOD ACCOUNT FOR IN 1968?

_____%

8. APPROXIMATELY WHAT PERCENT OF THE TOTAL VALUE OF YOUR BUILDING MATERIALS SALES DID PLYWOOD ACCOUNT FOR IN 1968?

_____%

Reported by _____ **Date** _____
(Name) (Title)

Telephone No. _____

GPO 848-566-7

SINGLE FAMILY HOMES

Bureau of Budget No. 40-S68112

Approval Expires December 31, 1969

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

MAIN OFFICE
240 WEST PROSPECT STREET
FORT COLLINS, COLORADO 80521

IN REPLY REFER TO
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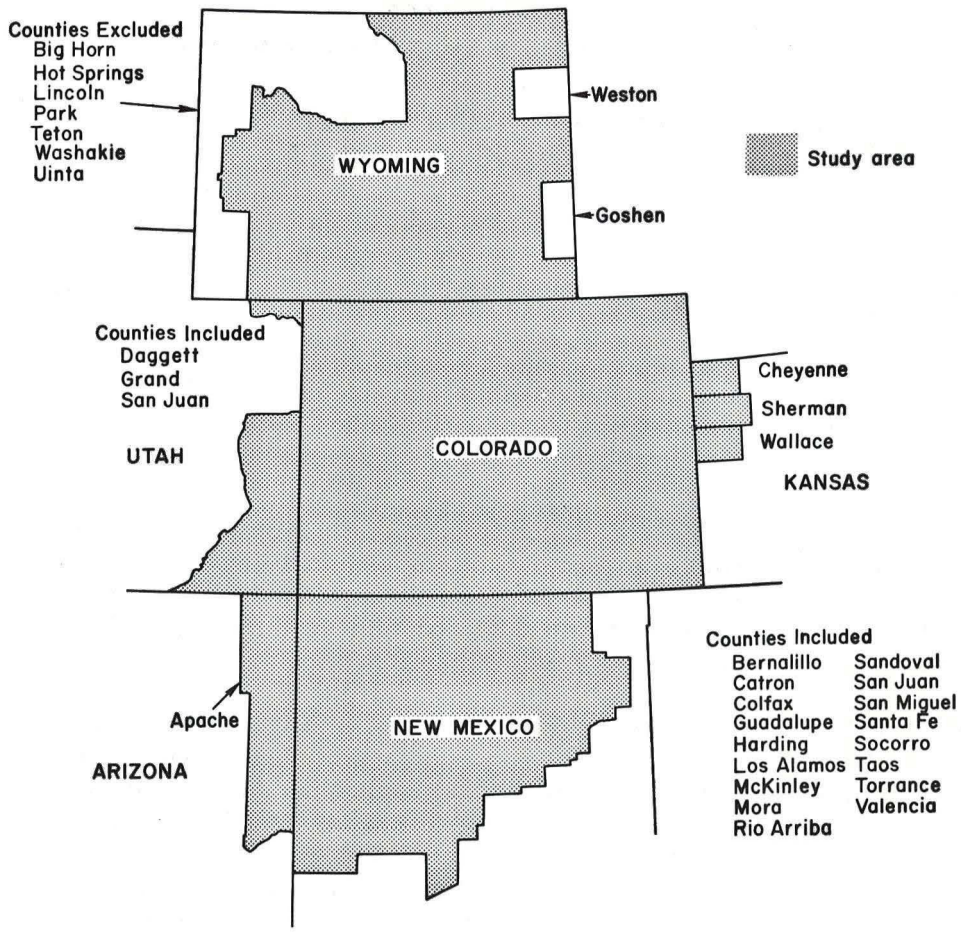
DENVER PLYWOOD MARKET STUDY AREA



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Do not report plywood used by subcontractors who worked for you, plywood used in manufactured components you bought, or plywood used outside the Study Area.

Plywood volume

Reporting plywood volumes in square feet of surface area is preferable, but provision is made to report number of sheets.

If sheets are the unit used, please give the length and width in feet; for example, 4 x 8, 4 x 9, 3 x 6, etc. To convert number of sheets to square feet, multiply the surface area by the number of sheets. Example: A 4 x 8 sheet has 32 square feet of surface area; therefore, ten 4 x 8 sheets (32 square feet) = 320 square feet of plywood.

Softwood and hardwood classification

The species of the face veneer determines the classification of the plywood. (For example, if the face veneer is a hardwood, classify the plywood as "hardwood plywood" regardless of what species is used for the back veneer or inner plies.)

Classify plywood as "softwood" if it is faced with a "medium density," "high density," or non wood-grain pattern "high pressure" overlay.

Classify the plywood according to the species represented by the overlay if it is faced with a wood-grain printed overlay.

1. DURING 1968, APPROXIMATELY HOW MUCH PLYWOOD WAS USED BY THIS ESTABLISHMENT IN THE STUDY AREA FOR ALL PURPOSES?

> If you used no plywood in the Study Area, check None below and return this questionnaire in the enclosed self-addressed envelope.

☐ None

Total softwood plywood used:

Square feet surface measure _____

or

	Number	*Size*
Sheets	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____

Total hardwood plywood used:

Square feet surface measure _____

or

	Number	*Size*
Sheets	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____

Approximately what percent of plywood reported above was used for each of the following purposes?

	Softwood (Percent of total)	*Hardwood*
Single family houses - on-site construction, remodeling, repair	_____%	_____%
Garden apartments (4 stories or less) construction, remodeling, repair	_____%	_____%
High-rise apartments (5 stories or more) - construction, remodeling, repair	_____%	_____%
Nonresidential buildings - on-site construction, remodeling, repair	_____%	_____%
Construction other than buildings	_____%	_____%
Manufactured homes and buildings	_____%	_____%
Mobile homes	_____%	_____%
TOTAL	100%	100%

2. DURING 1968, APPROXIMATELY HOW MUCH PLYWOOD WAS USED BY THIS ESTABLISHMENT IN THE STUDY AREA FOR CONSTRUCTION, REMODELING, AND REPAIR OF SINGLE FAMILY HOUSES? (INCLUDE PLYWOOD USED IN TOWN HOUSES, BUT NOT GARDEN APARTMENTS.)

If you used no plywood for single family houses in the Study Area, check None below and return this questionnaire in the enclosed self-addressed envelope.

☐ None

Total softwood plywood used in single family houses:

Square feet surface measure _____

or

	Number	*Size*
Sheets	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____

Total hardwood plywood used in single family houses:

Square feet surface measure _____

or

	Number	*Size*
Sheets	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____

3. APPROXIMATELY WHAT PERCENT OF THE SOFTWOOD AND HARDWOOD PLYWOOD USED IN SINGLE FAMILY HOUSES IN 1968 WAS OF EACH THICKNESS LISTED BELOW?

Thickness	*Softwood (Percent of total)*	*Hardwood (Percent of total)*
3/16"	_____%	_____%
1/4"	_____%	_____%
5/16"	_____%	_____%
3/8"	_____%	_____%
1/2"	_____%	_____%
5/8"	_____%	_____%
3/4"	_____%	_____%
Other (specify)		
_____	_____%	_____%
_____	_____%	_____%
TOTAL	100%	100%

4. APPROXIMATELY WHAT PERCENT OF THE SOFTWOOD AND HARDWOOD PLYWOOD USED IN SINGLE FAMILY HOUSES IN 1968 WAS OBTAINED DIRECTLY FROM EACH OF THE SOURCES LISTED BELOW?

Source	*Softwood (Percent of total)*	*Hardwood (Percent of total)*
Within Study Area:		
Mill	_____%	_____%
Wholesale dealer	_____%	_____%
Retail dealer	_____%	_____%
Importer	_____%	_____%
Other (specify)		
_____	_____%	_____%
Outside Study Area:		
Mill	_____%	_____%
Wholesale dealer	_____%	_____%
Retail dealer	_____%	_____%
Importer	_____%	_____%
Other (specify)		
_____	_____%	_____%
TOTAL	100%	100%

5. APPROXIMATELY WHAT PERCENT OF THE TOTAL SOFTWOOD PLYWOOD USED IN SINGLE FAMILY HOUSES IN 1968 DID YOUR ESTABLISHMENT USE FOR THE APPLICATIONS LISTED BELOW? WHAT THICKNESS AND SPECIES DID YOU USE MOST OFTEN FOR EACH APPLICATION?

> For concrete formwork, report only the plywood actually used up in forms. Do not report as formwork plywood reused as sheathing, etc.
>
> **Do not report plywood used in cabinets you bought ready made.**

Application	*Percent of total softwood used*	*Thickness most often used (inches)*	*Species most often used*
Roof sheathing	%	"	
Wall sheathing	%	"	
Siding	%	"	
Soffit	%	"	
Subflooring	%	"	
Floor underlayment	%	"	
Concrete formwork	%	"	
Wall paneling	%	"	
Cabinets	%	"	
Other (specify)	%	"	
TOTAL	100%		

6. APPROXIMATELY WHAT PERCENT OF THE TOTAL HARDWOOD PLYWOOD USED IN SINGLE FAMILY HOUSES IN 1968 DID YOUR ESTABLISHMENT USE FOR THE APPLICATION LISTED BELOW? WHAT THICKNESS AND SPECIES DID YOU USE MOST OFTEN FOR EACH PURPOSE?

Do not report plywood used in cabinets you bought ready made.

Application	*Percent of total hardwood used*	*Thickness most often used (inches)*	*Species most often used*
Finish flooring (plywood block)	%	"	
Wall paneling	%	"	
Siding	%	"	
Cabinets	%	"	
Other (specify)	%	"	
TOTAL	100%		

7. IN THE APPLICATIONS LISTED BELOW FOR SINGLE FAMILY HOUSES, APPROXIMATELY WHAT PERCENT OF THE TOTAL SQUARE FEET OF MATERIAL USED IN 1968 WAS PLYWOOD? WHAT MATERIALS OTHER THAN PLYWOOD WERE USED IN THESE SAME APPLICATIONS?

Application	*Plywood as percent of total material used in each application*	*Materials used other than plywood* — *Most often used*	*Next most often used*
Roof sheathing	_____%	_____	_____
Wall sheathing	_____%	_____	_____
Siding	_____%	_____	_____
Soffit	_____%	_____	_____
Subflooring	_____%	_____	_____
Floor underlayment	_____%	_____	_____
Concrete formwork	_____%	_____	_____
Wall paneling	_____%	_____	_____
Cabinets	_____%	_____	_____
Other (specify) _____	_____%	_____	_____

8. HOW MANY SINGLE FAMILY HOUSES DID YOU COMPLETE WORK ON IN THE STUDY AREA DURING 1968?

_____ (Number)

9. CHECK BELOW THE APPROXIMATE TOTAL VALUE OF YOUR WORK ON SINGLE FAMILY HOUSES AS A PRIME CONTRACTOR AND AS A SUBCONTRACTOR OR SELF-EMPLOYED CARPENTER IN 1968.

Value	*Work done as prime contractor*	*Work done as subcontractor or self-employed carpenter*
Up to $25,000	☐	☐
$ 25,000 - $ 49,999	☐	☐
$ 50,000 - $ 99,999	☐	☐
$100,000 - $199,999	☐	☐
$200,000 - $499,999	☐	☐
$500,000 - $999,999	☐	☐
Over $1,000,000	☐	☐

10. APPROXIMATELY WHAT PERCENT OF THE SOFTWOOD AND HARDWOOD PLYWOOD USED IN SINGLE FAMILY HOUSES IN 1968 WAS USED IN NEW CONSTRUCTION AND IN REMODELING, ALTERATION, OR REPAIR?

	Percent of total softwood	*Percent of total hardwood*
New construction	_____%	_____%
Remodeling, alteration, and repair	_____%	_____%
TOTAL	100%	100%

Reported by _____ Date _____
(Name) (Title)

Telephone No. _____

GPO 848-566-1

APARTMENTS

Bureau of Budget No. 40-S68112

Approval Expires December 31, 1969

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

MAIN OFFICE
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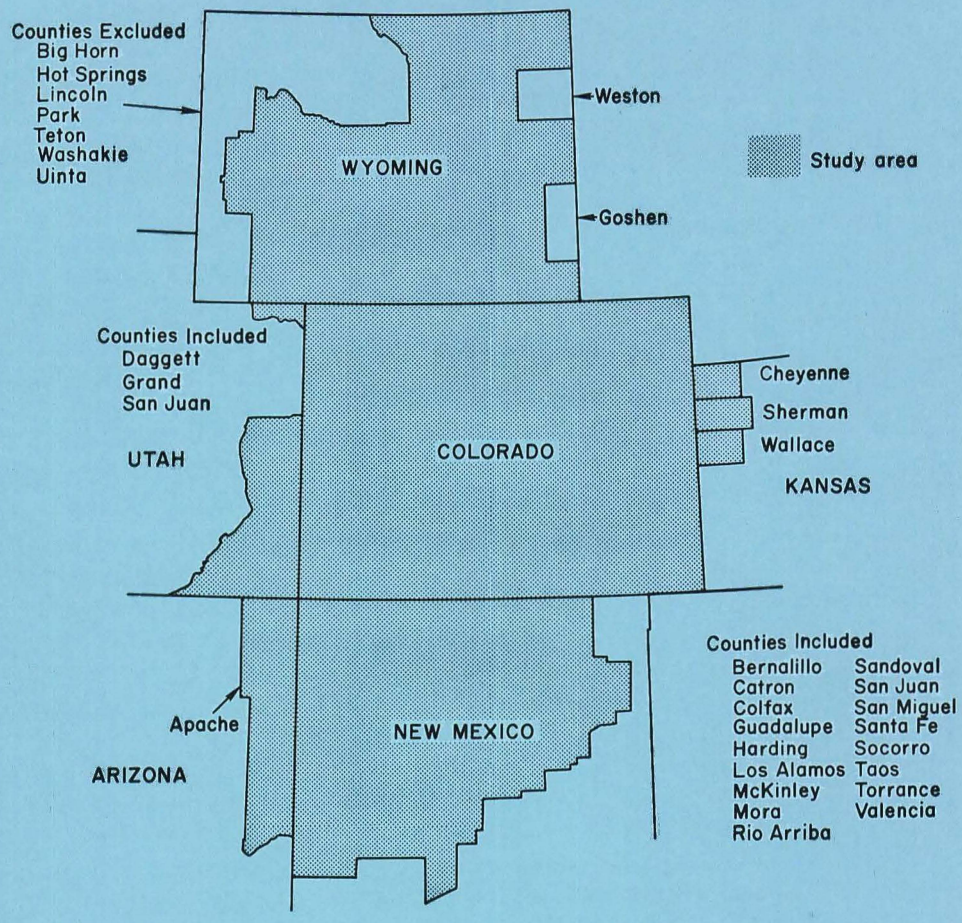

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Plywood volume

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Classify the plywood according to the species represented by the overlay if it is faced with a wood-grain printed overlay.

1. DURING 1968, APPROXIMATELY HOW MUCH PLYWOOD WAS USED BY THIS ESTABLISHMENT IN THE STUDY AREA FOR ALL PURPOSES?

> If you used no plywood in the Study Area, check None below and return this questionnaire in the enclosed self-addressed envelope.

☐ None

Total softwood plywood used:

Square feet surface measure _____
or

	Number	*Size*
Sheets	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____

Total hardwood plywood used:

Square feet surface measure _____
or

	Number	*Size*
Sheets	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____

Approximately what percent of plywood reported above was used for each of the following purposes?

	Softwood (Percent of total)	*Hardwood*
Single family houses - on-site construction, remodeling, repair	_____%	_____%
Garden apartments (4 stories or less) construction, remodeling, repair	_____%	_____%
High-rise apartments (5 stories or more) - construction, remodeling, repair	_____%	_____%
Nonresidential buildings - on-site construction, remodeling, repair	_____%	_____%
Construction other than buildings	_____%	_____%
Manufactured homes and buildings	_____%	_____%
Mobile homes	_____%	_____%
TOTAL	100%	100%

2. DURING 1968, APPROXIMATELY HOW MUCH PLYWOOD WAS USED BY THIS ESTABLISHMENT IN THE STUDY AREA FOR CONSTRUCTION, REMODELING, AND REPAIR OF APARTMENTS?

> If you used no plywood for apartments in the Study Area, check None below and return this questionnaire in the enclosed self-addressed envelope.

☐ None

Total softwood plywood used in apartments:

Square feet surface measure _____
or

	Number	*Size*
Sheets	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____

Total hardwood plywood used in apartments:

Square feet surface measure _____
or

	Number	*Size*
Sheets	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____

3. APPROXIMATELY WHAT PERCENT OF THE SOFTWOOD AND HARDWOOD PLYWOOD USED IN APARTMENTS IN 1968 WAS OF EACH THICKNESS LISTED BELOW?

Thickness	*Softwood (Percent of total)*	*Hardwood (Percent of total)*
3/16"	_____%	_____%
1/4"	_____%	_____%
5/16"	_____%	_____%
3/8"	_____%	_____%
1/2"	_____%	_____%
5/8"	_____%	_____%
3/4"	_____%	_____%
Other (specify)		
_____	_____%	_____%
_____	_____%	_____%
TOTAL	100%	100%

4. APPROXIMATELY WHAT PERCENT OF THE SOFTWOOD AND HARDWOOD PLYWOOD USED IN APARTMENTS IN 1968 WAS OBTAINED DIRECTLY FROM EACH OF THE SOURCES LISTED BELOW?

Source	*Softwood (Percent of total)*	*Hardwood (Percent of total)*
Within Study Area:		
Mill	_____%	_____%
Wholesale dealer	_____%	_____%
Retail dealer	_____%	_____%
Importer	_____%	_____%
Other (specify)		
_____	_____%	_____%
Outside Study Area:		
Mill	_____%	_____%
Wholesale dealer	_____%	_____%
Retail dealer	_____%	_____%
Importer	_____%	_____%
Other (specify)		
_____	_____%	_____%
TOTAL	100%	100%

5. APPROXIMATELY WHAT PERCENT OF THE TOTAL SOFTWOOD PLYWOOD USED IN APARTMENTS IN 1968 DID YOUR ESTABLISHMENT USE FOR THE APPLICATIONS LISTED BELOW? WHAT THICKNESS AND SPECIES DID YOU USE MOST OFTEN FOR EACH APPLICATION?

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>
> Do not report plywood used in cabinets you bought ready made.

Application	*Percent of total softwood used*	*Thickness most often used (inches)*	*Species most often used*
Roof sheathing	%	"	
Wall sheathing	%	"	
Siding	%	"	
Soffit	%	"	
Subflooring	%	"	
Floor underlayment	%	"	
Concrete formwork	%	"	
Wall paneling	%	"	
Cabinets	%	"	
Other (specify)	%	"	
TOTAL	100%		

6. APPROXIMATELY WHAT PERCENT OF THE TOTAL HARDWOOD PLYWOOD USED IN APARTMENTS IN 1968 DID YOUR ESTABLISHMENT USE FOR THE APPLICATIONS LISTED BELOW? WHAT THICKNESS AND SPECIES DID YOU USE MOST OFTEN FOR EACH APPLICATION?

Do not report plywood used in cabinets you bought ready made.

Application	*Percent of total hardwood used*	*Thickness most often used (inches)*	*Species most often used*
Finish flooring (plywood block)	%	"	
Wall paneling	%	"	
Siding	%	"	
Cabinets	%	"	
Other (specify)	%	"	
TOTAL	100%		

7. IN THE APPLICATIONS LISTED BELOW FOR APARTMENTS, APPROXIMATELY WHAT PERCENT OF THE TOTAL SQUARE FEET OF MATERIAL USED IN 1968 WAS PLYWOOD? WHAT MATERIALS OTHER THAN PLYWOOD WERE USED IN THESE SAME APPLICATIONS?

Application	*Plywood as percent of total material used in each application*	*Materials used other than plywood* — *Most often used*	*Next most often used*
Roof sheathing	_____%	_____	_____
Wall sheathing	_____%	_____	_____
Siding	_____%	_____	_____
Soffit	_____%	_____	_____
Subflooring	_____%	_____	_____
Floor underlayment	_____%	_____	_____
Concrete formwork	_____%	_____	_____
Wall paneling	_____%	_____	_____
Cabinets	_____%	_____	_____
Other (specify) _____	_____%	_____	_____

8. HOW MANY APARTMENT UNITS DID YOU COMPLETE WORK ON IN THE STUDY AREA DURING 1968?

Garden apartments (4 stories or less) _____ Number of units

High-rise apartments (5 stories or more) _____ Number of units

9. CHECK BELOW THE APPROXIMATE TOTAL VALUE OF YOUR WORK ON APARTMENTS AS A PRIME CONTRACTOR AND AS A SUBCONTRACTOR OR SELF-EMPLOYED CARPENTER IN 1968.

Value	*Work done as prime contractor*	*Work done as subcontractor or self-employed carpenter*
Up to $25,000	☐	☐
$ 25,000 - $ 49,999	☐	☐
$ 50,000 - $ 99,999	☐	☐
$100,000 - $199,999	☐	☐
$200,000 - $499,999	☐	☐
$500,000 - $999,999	☐	☐
Over $1,000,000	☐	☐

10. APPROXIMATELY WHAT PERCENT OF THE SOFTWOOD AND HARDWOOD PLYWOOD TOTALS USED IN APARTMENTS IN 1968 WAS USED IN NEW CONSTRUCTION AND IN REMODELING, ALTERATION, OR REPAIR?

	Percent of total softwood	*Percent of total hardwood*
New construction	_____%	_____%
Remodeling, alteration, and repair	_____%	_____%
TOTAL	100%	100%

Reported by _____ Date _____
(Name) (Title)

Telephone No. _____

GPO 848-566-2

NON-RESIDENTIAL CONSTRUCTION

Bureau of Budget No. 40-S68112

Approval Expires December 31, 1969

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

MAIN OFFICE
240 WEST PROSPECT STREET
FORT COLLINS, COLORADO 80521

IN REPLY REFER TO
4830

April, 1969

Gentlemen:

We again need your help in obtaining plywood information. Your reply to our preliminary inquiry a few weeks ago helped us identify plywood users and distributors in your area. Now, we are asking a selected group of firms to provide further facts by answering the questions that follow this letter.

This information on current and prospective markets for plywood is needed in evaluating the adequacy of the nation's timber management programs and, especially, in projecting probable future needs for veneer quality timber to meet the requirements of this market.

We hope you will find the few minutes necessary to answer these questions and return this booklet promptly in the enclosed self-addressed envelope (no stamp needed). Your answers are especially important since you are one of a limited number of firms chosen to represent your particular kind of business.

Replies will be kept strictly confidential. Information you report will be combined with answers from others so that no facts about your individual business will be disclosed.

We and our cooperators at Colorado State University greatly appreciate your help.

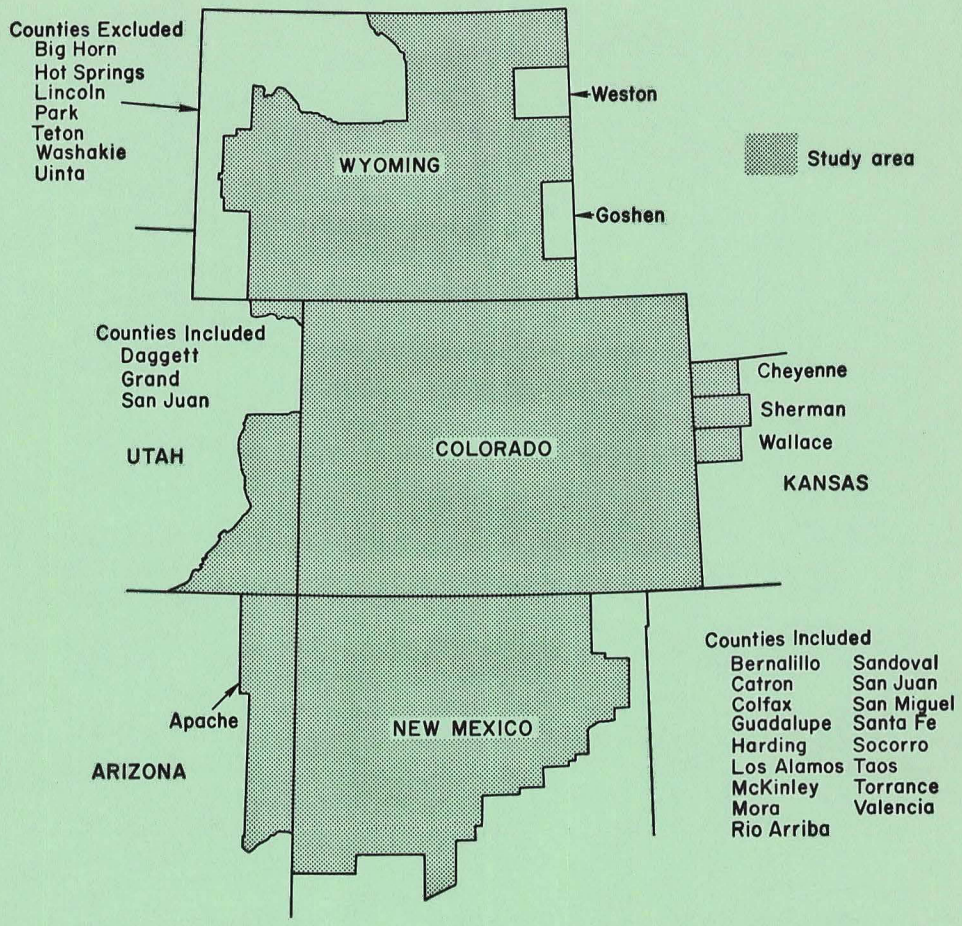
Sincerely yours,

Raymond Price

RAYMOND PRICE
Director

Enclosure

DENVER PLYWOOD MARKET STUDY AREA



INSTRUCTIONS

Plywood to report

Report only for the establishment shown in the address. (If there is more than one establishment in your firm, each will be asked to report separately.)

Include only the amounts of plywood used by you or your employees in the Study Area. (Refer to map above for Study Area boundaries.)

Do not report plywood used by subcontractors who worked for you, plywood used in manufactured components you bought, or plywood used outside the Study Area.

Plywood volume

Reporting plywood volumes in square feet of surface area is preferable, but provision is made to report number of sheets.

If sheets are the unit used, please give the length and width in feet; for example, 4 x 8, 4 x 9, 3 x 6, etc. To convert number of sheets to square feet, multiply the surface area by the number of sheets. Example: A 4 x 8 sheet has 32 square feet of surface area; therefore, ten 4 x 8 sheets (32 square feet) = 320 square feet of plywood.

Softwood and hardwood classification

The species of the face veneer determines the classification of the plywood. (For example, if the face veneer is a hardwood, classify the plywood as "hardwood plywood" regardless of what species is used for the back veneer or inner plies.)

Classify plywood as "softwood" if it is faced with a "medium density," "high density," or non wood-grain pattern "high pressure" overlay.

Classify the plywood according to the species represented by the overlay if it is faced with a wood-grain printed overlay.

1. DURING 1968, APPROXIMATELY HOW MUCH PLYWOOD WAS USED BY THIS ESTABLISHMENT IN THE STUDY AREA FOR ALL PURPOSES?

> If you used no plywood in the Study Area, check None below and return this questionnaire in the enclosed self-addressed envelope.

☐ None

Total softwood plywood used:

Square feet surface measure _____
or

	Number	*Size*
Sheets	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____

Total hardwood plywood used:

Square feet surface measure _____
or

	Number	*Size*
Sheets	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____

Approximately what percent of plywood reported above was used for each of the following purposes?

	Softwood (Percent of total)	*Hardwood (Percent of total)*
Single family houses - on-site construction, remodeling, repair	_____%	_____%
Garden apartments (4 stories or less) construction, remodeling, repair	_____%	_____%
High-rise apartments (5 stories or more) - construction, remodeling, repair	_____%	_____%
Nonresidential buildings - on-site construction, remodeling, repair	_____%	_____%
Construction other than buildings	_____%	_____%
Manufactured homes and buildings	_____%	_____%
Mobile homes	_____%	_____%
TOTAL	100%	100%

2. DURING 1968, APPROXIMATELY HOW MUCH PLYWOOD WAS USED BY THIS ESTABLISHMENT IN THE STUDY AREA FOR NONRESIDENTIAL CONSTRUCTION, REMODELING, AND REPAIR? (INCLUDE PLYWOOD USED IN ALL NONRESIDENTIAL BUILDINGS AND IN CONSTRUCTION OTHER THAN BUILDINGS; I.E., HIGHWAYS, BRIDGES, ETC.)

If you used no plywood for nonresidential construction in the Study Area, check None below and return this questionnaire in the enclosed self-addressed envelope.

☐ None

Total softwood plywood used in nonresidential construction:

Square feet surface measure _____
or

	Number	*Size*
Sheets	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____

Total hardwood plywood used in nonresidential construction:

Square feet surface measure _____
or

	Number	*Size*
Sheets	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____

3. APPROXIMATELY WHAT PERCENT OF THE SOFTWOOD AND HARDWOOD PLYWOOD USED IN NONRESIDENTIAL CONSTRUCTION IN 1968 WAS OF EACH THICKNESS LISTED BELOW?

Thickness	*Softwood (Percent of total)*	*Hardwood (Percent of total)*
3/16"	_____%	_____%
1/4"	_____%	_____%
5/16"	_____%	_____%
3/8"	_____%	_____%
1/2"	_____%	_____%
5/8"	_____%	_____%
3/4"	_____%	_____%
Other (specify)		
_____	_____%	_____%
_____	_____%	_____%
TOTAL	100%	100%

4. APPROXIMATELY WHAT PERCENT OF THE SOFTWOOD AND HARDWOOD PLYWOOD USED IN NONRESIDENTIAL CONSTRUCTION IN 1968 WAS OBTAINED DIRECTLY FROM EACH OF THE SOURCES LISTED BELOW?

Source	*Softwood (Percent of total)*	*Hardwood (Percent of total)*
Within Study Area:		
Mill	_____%	_____%
Wholesale dealer	_____%	_____%
Retail dealer	_____%	_____%
Importer	_____%	_____%
Other (specify)		
_____	_____%	_____%
Outside Study Area:		
Mill	_____%	_____%
Wholesale dealer	_____%	_____%
Retail dealer	_____%	_____%
Importer	_____%	_____%
Other (specify)		
_____	_____%	_____%
TOTAL	100%	100%

5. APPROXIMATELY WHAT PERCENT OF THE TOTAL SOFTWOOD PLYWOOD USED IN NONRESIDENTIAL CONSTRUCTION IN 1968 DID YOUR ESTABLISHMENT USE FOR THE APPLICATIONS LISTED BELOW? WHAT THICKNESS AND SPECIES DID YOU USE MOST OFTEN FOR EACH APPLICATION?

> For concrete formwork, report only the plywood actually used up in forms. Do not report as formwork plywood reused as sheathing, etc.
>
> Do not report plywood used in cabinets you bought ready made.

Application	*Percent of total softwood used*	*Thickness most often used (inches)*	*Species most often used*
Roof sheathing	%	"	
Wall sheathing	%	"	
Siding	%	"	
Soffit	%	"	
Subflooring	%	"	
Floor underlayment	%	"	
Concrete formwork	%	"	
Wall paneling	%	"	
Cabinets	%	"	
Other (specify)	%	"	
TOTAL	100%		

6. APPROXIMATELY WHAT PERCENT OF THE TOTAL HARDWOOD PLYWOOD USED IN NONRESIDENTIAL CONSTRUCTION IN 1968 DID YOUR ESTABLISHMENT USE FOR THE APPLICATIONS LISTED BELOW? WHAT THICKNESS AND SPECIES DID YOU USE MOST OFTEN FOR EACH APPLICATION?

Do not report plywood used in cabinets you bought ready made.

Application	*Percent of total hardwood used*	*Thickness most often used (inches)*	*Species most often used*
Finish flooring (plywood block)	%	"	
Wall paneling	%	"	
Siding	%	"	
Cabinets	%	"	
Other (specify)	%	"	
TOTAL	100%		

7. IN THE APPLICATIONS LISTED BELOW FOR NONRESIDENTIAL CONSTRUCTION, APPROXIMATELY WHAT PERCENT OF THE TOTAL SQUARE FEET OF MATERIAL USED IN 1968 WAS PLYWOOD? WHAT MATERIALS OTHER THAN PLYWOOD WERE USED IN THESE SAME APPLICATIONS?

Application	*Plywood as percent of total material used in each application*	*Materials used other than plywood* — *Most often used*	*Next most often used*
Roof sheathing	_____%	_____	_____
Wall sheathing	_____%	_____	_____
Siding	_____%	_____	_____
Soffit	_____%	_____	_____
Subflooring	_____%	_____	_____
Floor underlayment	_____%	_____	_____
Concrete formwork	_____%	_____	_____
Wall paneling	_____%	_____	_____
Cabinets	_____%	_____	_____
Other (specify) _____	_____%	_____	_____

8. HOW MANY PROJECTS OF THE TYPES LISTED BELOW DID YOU COMPLETE WORK ON IN THE STUDY AREA DURING 1968?

Nonresidential buildings (commercial, industrial, institutional, etc.) _____ Number of projects

Construction other than buildings (highways, bridges, docks, etc.) _____ Number of projects

9. CHECK BELOW THE APPROXIMATE TOTAL VALUE OF YOUR WORK ON NONRESIDENTIAL CONSTRUCTION AS A PRIME CONTRACTOR AND AS A SUBCONTRACTOR OR SELF-EMPLOYED CARPENTER IN 1968.

Value	*Work done as prime contractor*	*Work done as subcontractor or self-employed carpenter*
Up to $25,000	☐	☐
$ 25,000 - $ 49,999	☐	☐
$ 50,000 - $ 99,999	☐	☐
$100,000 - $199,999	☐	☐
$200,000 - $499,999	☐	☐
$500,000 - $999,999	☐	☐
Over $1,000,000	☐	☐

10. APPROXIMATELY WHAT PERCENT OF THE SOFTWOOD AND HARDWOOD PLYWOOD USED IN NONRESIDENTIAL CONSTRUCTION IN 1968 WAS USED IN NEW CONSTRUCTION AND IN REMODELING, ALTERATION, OR REPAIR?

	Percent of total softwood	*Percent of total hardwood*
New construction	_____%	_____%
Remodeling, alteration, and repair	_____%	_____%
TOTAL	100%	100%

Reported by _____ Date _____
(Name) (Title)

Telephone No. _____

GPO 848-566-3

MOBILE HOMES

Bureau of Budget No. 40-S68112

Approval Expires December 31, 1969

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

MAIN OFFICE
240 WEST PROSPECT STREET
FORT COLLINS, COLORADO 80521

IN REPLY REFER TO
4830

April, 1969

Gentlemen:

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This information on current and prospective markets for plywood is needed in evaluating the adequacy of the nation's timber management programs and, especially, in projecting probable future needs for veneer quality timber to meet the requirements of this market.

We hope you will find the few minutes necessary to answer these questions and return this booklet promptly in the enclosed self-addressed envelope (no stamp needed). Your answers are especially important since you are one of a limited number of firms chosen to represent your particular kind of business.

Replies will be kept strictly confidential. Information you report will be combined with answers from others so that no facts about your individual business will be disclosed.

We and our cooperators at Colorado State University greatly appreciate your help.

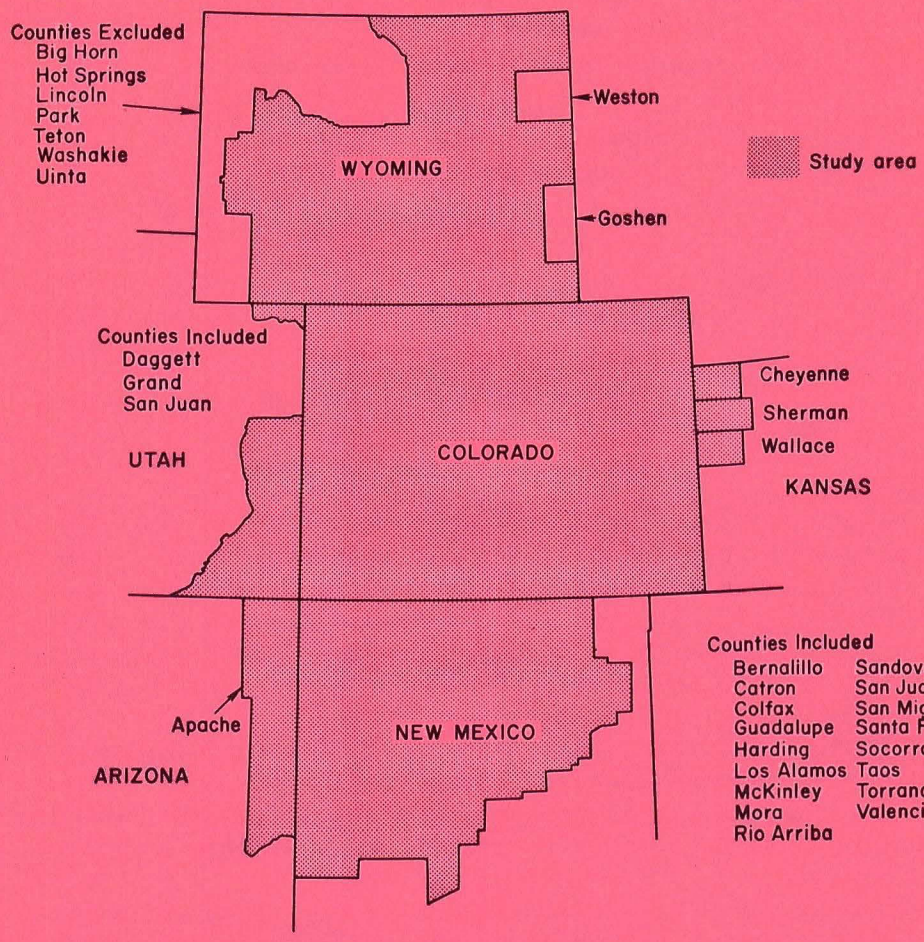
Sincerely yours,

Raymond Price

RAYMOND PRICE
Director

Enclosure

DENVER PLYWOOD MARKET STUDY AREA



INSTRUCTIONS

Plywood to report

Report only for the establishment shown in the address. (If there is more than one establishment in your firm, each will be asked to report separately.)

Include only the amounts of plywood used by you or your employees in the Study Area. (Refer to map above for Study Area boundaries.)

Do not report plywood used by subcontractors who worked for you, plywood used in manufactured components you bought, or plywood used outside the Study Area.

Plywood volume

Reporting plywood volumes in square feet of surface area is preferable, but provision is made to report number of sheets.

If sheets are the unit used, please give the length and width in feet; for example, 4 x 8, 4 x 9, 3 x 6, etc. To convert number of sheets to square feet, multiply the surface area by the number of sheets. Example: A 4 x 8 sheet has 32 square feet of surface area; therefore, ten 4 x 8 sheets (32 square feet) = 320 square feet of plywood.

Softwood and hardwood classification

The species of the face veneer determines the classification of the plywood. (For example, if the face veneer is a hardwood, classify the plywood as "hardwood plywood" regardless of what species is used for the back veneer or inner plies.)

Classify plywood as "softwood" if it is faced with a "medium density," "high density," or non wood-grain pattern "high pressure" overlay.

Classify the plywood according to the species represented by the overlay if it is faced with a wood-grain printed overlay.

1. DURING 1968, APPROXIMATELY HOW MUCH PLYWOOD WAS USED BY THIS ESTABLISHMENT IN THE STUDY AREA FOR ALL PURPOSES?

> If you used no plywood in the Study Area, check None below and return this questionnaire in the enclosed self-addressed envelope.

☐ None

Total softwood plywood used:

Square feet surface measure _____
or

	Number	*Size*
Sheets	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____

Total hardwood plywood used:

Square feet surface measure _____
or

	Number	*Size*
Sheets	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____

Approximately what percent of plywood reported above was used for each of the following purposes?

	Softwood (Percent of total)	*Hardwood*
Single family houses - on-site construction, remodeling, repair	_____%	_____%
Garden apartments (4 stories or less) construction, remodeling, repair	_____%	_____%
High-rise apartments (5 stories or more) - construction, remodeling, repair	_____%	_____%
Nonresidential buildings - on-site construction, remodeling, repair	_____%	_____%
Construction other than buildings	_____%	_____%
Manufactured homes and buildings	_____%	_____%
Mobile homes	_____%	_____%
TOTAL	100%	100%

2. DURING 1968, APPROXIMATELY HOW MUCH PLYWOOD WAS USED BY THIS ESTABLISHMENT IN THE STUDY AREA IN MANUFACTURING MOBILE HOMES?

> If you used no plywood in manufacturing mobile homes in the Study Area, check None below and return this questionnaire in the enclosed self-addressed envelope.

☐ None

Total softwood plywood used in manufacturing mobile homes:

Square feet surface measure _____

or

	Number	*Size*
Sheets	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____

Total hardwood plywood used in manufacturing mobile homes:

Square feet surface measure _____

or

	Number	*Size*
Sheets	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____

3. APPROXIMATELY WHAT PERCENT OF THE SOFTWOOD AND HARDWOOD PLYWOOD USED IN MANUFACTURING MOBILE HOMES IN 1968 WAS OF EACH THICKNESS LISTED BELOW?

Thickness	*Softwood (Percent of total)*	*Hardwood (Percent of total)*
3/16"	_____%	_____%
1/4"	_____%	_____%
5/16"	_____%	_____%
3/8"	_____%	_____%
1/2"	_____%	_____%
5/8"	_____%	_____%
3/4"	_____%	_____%
Other (specify)		
_____	_____%	_____%
_____	_____%	_____%
TOTAL	100%	100%

4. APPROXIMATELY WHAT PERCENT OF THE SOFTWOOD AND HARDWOOD PLYWOOD USED IN MANUFACTURING MOBILE HOMES IN 1968 WAS OBTAINED DIRECTLY FROM EACH OF THE SOURCES LISTED BELOW?

Source	*Softwood (Percent of total)*	*Hardwood (Percent of total)*
Within Study Area:		
Mill	_____%	_____%
Wholesale dealer	_____%	_____%
Retail dealer	_____%	_____%
Importer	_____%	_____%
Other (specify)		
_____	_____%	_____%
Outside Study Area:		
Mill	_____%	_____%
Wholesale dealer	_____%	_____%
Retail dealer	_____%	_____%
Importer	_____%	_____%
Other (specify)		
_____	_____%	_____%
TOTAL	100%	100%

5. APPROXIMATELY WHAT PERCENT OF THE TOTAL SOFTWOOD PLYWOOD USED IN MANUFACTURING MOBILE HOMES IN 1968 DID YOUR ESTABLISHMENT USE FOR THE APPLICATIONS LISTED BELOW? WHAT THICKNESS AND SPECIES DID YOU USE MOST OFTEN FOR EACH PURPOSE?

Do not report plywood used in cabinets you bought ready made.

Application	*Percent of total softwood used*	*Thickness most often used (inches)*	*Species most often used*
Roof sheathing	%	"	
Wall sheathing	%	"	
Siding	%	"	
Soffit	%	"	
Subflooring	%	"	
Floor underlayment	%	"	
Wall paneling	%	"	
Cabinets	%	"	
Other (specify)	%	"	
TOTAL	100%		

6. APPROXIMATELY WHAT PERCENT OF THE TOTAL HARDWOOD PLYWOOD USED IN MANUFACTURING MOBILE HOMES IN 1968 DID YOUR ESTABLISHMENT USE FOR THE APPLICATIONS LISTED BELOW? WHAT THICKNESS AND SPECIES DID YOU USE MOST OFTEN FOR EACH APPLICATION?

Do not report plywood used in cabinets you bought ready made.

Application	*Percent of total hardwood used*	*Thickness most often used (inches)*	*Species most often used*
Finish flooring (plywood block)	%	"	
Wall paneling	%	"	
Siding	%	"	
Cabinets	%	"	
Other (specify)	%	"	
TOTAL	100%		

7. IN THE APPLICATIONS LISTED BELOW FOR MOBILE HOMES, APPROXIMATELY WHAT PERCENT OF THE TOTAL SQUARE FEET OF MATERIAL USED IN 1968 WAS PLYWOOD? WHAT MATERIALS OTHER THAN PLYWOOD WERE USED IN THESE SAME APPLICATIONS?

Application	*Plywood as percent of total material used in each application*	*Materials used other than plywood* — *Most often used*	*Next most often used*
Roof sheathing	_____%	_____	_____
Wall sheathing	_____%	_____	_____
Siding	_____%	_____	_____
Soffit	_____%	_____	_____
Subflooring	_____%	_____	_____
Floor underlayment	_____%	_____	_____
Wall paneling	_____%	_____	_____
Cabinets	_____%	_____	_____
Other (specify)			
_____	_____%	_____	_____

8. WHAT WERE THE SIZES OF THE MOBILE HOMES YOU PRODUCED IN 1968 AND HOW MANY DID YOU PRODUCE OF EACH SIZE?

List Sizes (12' x 60', etc.)	*Number*
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Reported by _____ Date _____
(Name) (Title)

Telephone No. _____

GPO 848-566-5

MANUFACTURED HOMES AND BUILDINGS

Bureau of Budget No. 40-S68112

Approval Expires December 31, 1969

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

MAIN OFFICE
240 WEST PROSPECT STREET
FORT COLLINS, COLORADO 80521

IN REPLY REFER TO
4830

April, 1969

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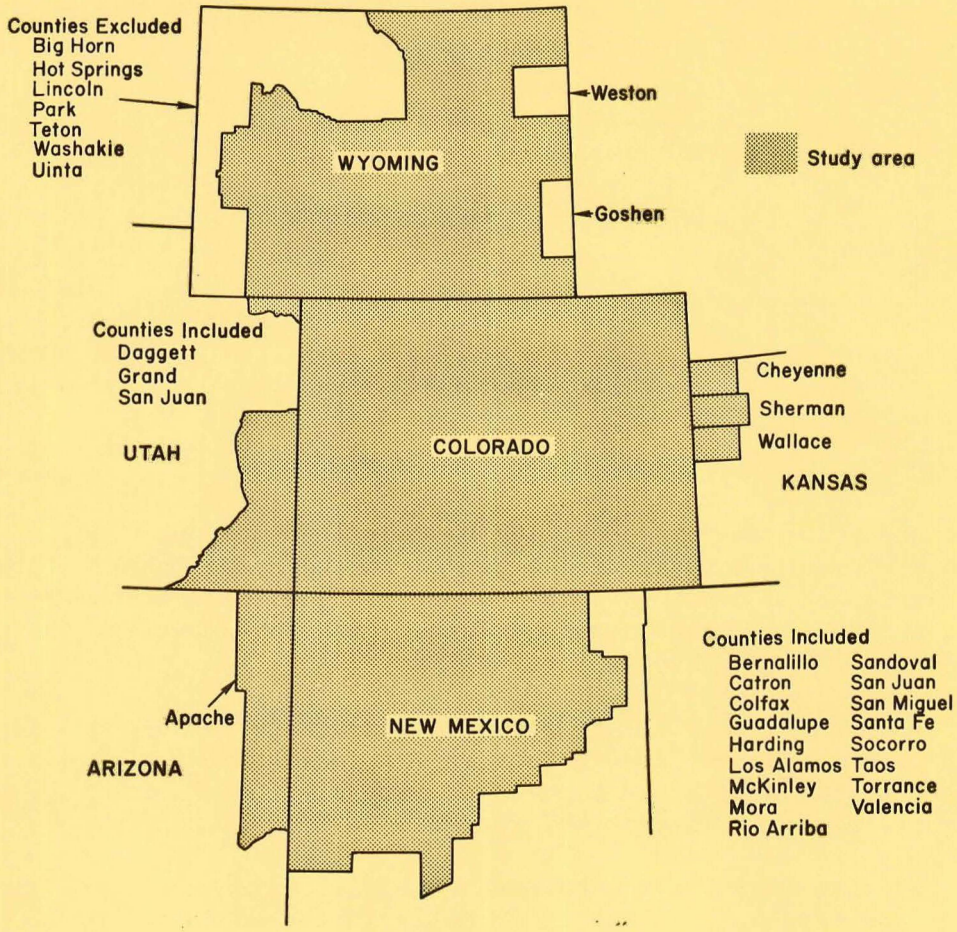
Raymond Price

RAYMOND PRICE
Director

Enclosure

DENVER PLYWOOD MARKET STUDY AREA



INSTRUCTIONS

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Plywood volume

Reporting plywood volumes in square feet of surface area is preferable, but provision is made to report number of sheets.

If sheets are the unit used, please give the length and width in feet; for example, 4 x 8, 4 x 9, 3 x 6, etc. To convert number of sheets to square feet, multiply the surface area by the number of sheets. Example: A 4 x 8 sheet has 32 square feet of surface area; therefore, ten 4 x 8 sheets (32 square feet) = 320 square feet of plywood.

Softwood and hardwood classification

The species of the face veneer determines the classification of the plywood. (For example, if the face veneer is a hardwood, classify the plywood as "hardwood plywood" regardless of what species is used for the back veneer or inner plies.)

Classify plywood as "softwood" if it is faced with a "medium density," "high density," or non wood-grain pattern "high pressure" overlay.

Classify the plywood according to the species represented by the overlay if it is faced with a wood-grain printed overlay.

1. DURING 1968, APPROXIMATELY HOW MUCH PLYWOOD WAS USED BY THIS ESTABLISHMENT IN THE STUDY AREA FOR ALL PURPOSES?

> If you used no plywood in the Study Area, check None below and return this questionnaire in the enclosed self-addressed envelope.

☐ None

Total softwood plywood used:

Square feet surface measure _____
or

	Number	*Size*
Sheets	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____

Total hardwood plywood used:

Square feet surface measure _____
or

	Number	*Size*
Sheets	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____

Approximately what percent of plywood reported above was used for each of the following purposes?

	Softwood (Percent of total)	*Hardwood*
Single family houses - on-site construction, remodeling, repair	_____%	_____%
Garden apartments (4 stories or less) construction, remodeling, repair	_____%	_____%
High-rise apartments (5 stories or more) - construction, remodeling, repair	_____%	_____%
Nonresidential buildings - on-site construction, remodeling, repair	_____%	_____%
Construction other than buildings	_____%	_____%
Manufactured homes and buildings	_____%	_____%
Mobile homes	_____%	_____%
TOTAL	100%	100%

2. DURING 1968, APPROXIMATELY HOW MUCH PLYWOOD WAS USED BY THIS ESTABLISHMENT IN THE STUDY AREA IN MANUFACTURED HOMES AND BUILDINGS?

> If you used no plywood in manufactured homes and buildings in the Study Area, check None below and return this questionnaire in the enclosed self-addressed envelope.

☐ None

Total softwood plywood used in manufactured homes and buildings:

Square feet surface measure _____

or

	Number	*Size*
Sheets	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____

Total hardwood plywood used in manufactured homes and buildings:

Square feet surface measure _____

or

	Number	*Size*
Sheets	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____

3. APPROXIMATELY WHAT PERCENT OF THE SOFTWOOD AND HARDWOOD PLYWOOD USED IN MANUFACTURED HOMES AND BUILDINGS IN 1968 WAS OF EACH THICKNESS LISTED BELOW?

Thickness	*Softwood (Percent of total)*	*Hardwood (Percent of total)*
3/16"	____%	____%
1/4"	____%	____%
5/16"	____%	____%
3/8"	____%	____%
1/2"	____%	____%
5/8"	____%	____%
3/4"	____%	____%
Other (specify)		
_____	____%	____%
_____	____%	____%
TOTAL	100%	100%

4. APPROXIMATELY WHAT PERCENT OF THE SOFTWOOD AND HARDWOOD PLYWOOD USED IN MANUFACTURED HOMES AND BUILDINGS IN 1968 WAS OBTAINED DIRECTLY FROM EACH OF THE SOURCES LISTED BELOW?

Source	*Softwood (Percent of total)*	*Hardwood (Percent of total)*
Within Study Area:		
Mill	____%	____%
Wholesale dealer	____%	____%
Retail dealer	____%	____%
Importer	____%	____%
Other (specify)		
_____	____%	____%
Outside Study Area:		
Mill	____%	____%
Wholesale dealer	____%	____%
Retail dealer	____%	____%
Importer	____%	____%
Other (specify)		
_____	____%	____%
TOTAL	100%	100%

5. APPROXIMATELY WHAT PERCENT OF THE TOTAL SOFTWOOD PLYWOOD USED IN MANUFACTURED HOMES AND BUILDINGS IN 1968 DID YOUR ESTABLISHMENT USE FOR THE APPLICATIONS LISTED BELOW? WHAT THICKNESS AND SPECIES DID YOU USE MOST OFTEN FOR EACH APPLICATION?

Do not report plywood used in cabinets you bought ready made.

Application	*Percent of total softwood used*	*Thickness most often used (inches)*	*Species most often used*
Roof sheathing	%	"	
Wall sheathing	%	"	
Siding	%	"	
Soffit	%	"	
Subflooring	%	"	
Floor underlayment	%	"	
Wall paneling	%	"	
Cabinets	%	"	
Other (specify)	%	"	
TOTAL	100%		

6. APPROXIMATELY WHAT PERCENT OF THE TOTAL HARDWOOD PLYWOOD USED IN MANUFACTURED HOMES AND BUILDINGS IN 1968 DID YOUR ESTABLISHMENT USE FOR THE APPLICATIONS LISTED BELOW? WHAT THICKNESS AND SPECIES DID YOU USE MOST OFTEN FOR EACH APPLICATION?

Do not report plywood used in cabinets you bought ready made.

Application	*Percent of total hardwood used*	*Thickness most often used (inches)*	*Species most often used*
Finish flooring (plywood block)	%	"	
Wall paneling	%	"	
Siding	%	"	
Cabinets	%	"	
Other (specify)	%	"	
TOTAL	100%		

7. IN THE APPLICATIONS LISTED BELOW FOR MANUFACTURED HOMES AND BUILDINGS, APPROXIMATELY WHAT PERCENT OF THE TOTAL SQUARE FEET OF MATERIAL USED IN 1968 WAS PLYWOOD? WHAT MATERIALS OTHER THAN PLYWOOD WERE USED IN THESE SAME APPLICATIONS?

Application	*Plywood as percent of total material used in each application*	*Materials used other than plywood* — *Most often used*	*Next most often used*
Roof sheathing	_____%	_____	_____
Wall sheathing	_____%	_____	_____
Siding	_____%	_____	_____
Soffit	_____%	_____	_____
Subflooring	_____%	_____	_____
Floor underlayment	_____%	_____	_____
Concrete formwork	_____%	_____	_____
Wall paneling	_____%	_____	_____
Cabinets	_____%	_____	_____
Other (specify)			
_____	_____%	_____	_____

8. HOW MANY BUILDINGS OF THE TYPES LISTED BELOW DID YOU PRODUCE IN THE STUDY AREA DURING 1968? WHAT PERCENT OF YOUR TOTAL MANUFACTURED BUILDING SALES DID EACH REPRESENT?

Type of Structure	*Number of Buildings*	*Number of Dwelling Units*	*Percent of Total Building Sales*
Single family homes (including town houses)			
Garden apartments and duplexes			
Commercial buildings			
Industrial buildings			
Other (specify) _____			
TOTAL			100%

Reported by _____ Date _____
(Name) (Title)

Telephone No. _____

MANUFACTURING

Bureau of Budget No. 40-S68112

Approval Expires December 31, 1969

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

MAIN OFFICE
240 WEST PROSPECT STREET
FORT COLLINS, COLORADO 80521

IN REPLY REFER TO
4830

April, 1969

Gentlemen:

We again need your help in obtaining plywood information. Your reply to our preliminary inquiry a few weeks ago helped us identify plywood users and distributors in your area. Now, we are asking a selected group of firms to provide further facts by answering the questions that follow this letter.

This information on current and prospective markets for plywood is needed in evaluating the adequacy of the nation's timber management programs and, especially, in projecting probable future needs for veneer quality timber to meet the requirements of this market.

We hope you will find the few minutes necessary to answer these questions and return this booklet promptly in the enclosed self-addressed envelope (no stamp needed). Your answers are especially important since you are one of a limited number of firms chosen to represent your particular kind of business.

Replies will be kept strictly confidential. Information you report will be combined with answers from others so that no facts about your individual business will be disclosed.

We and our cooperators at Colorado State University greatly appreciate your help.

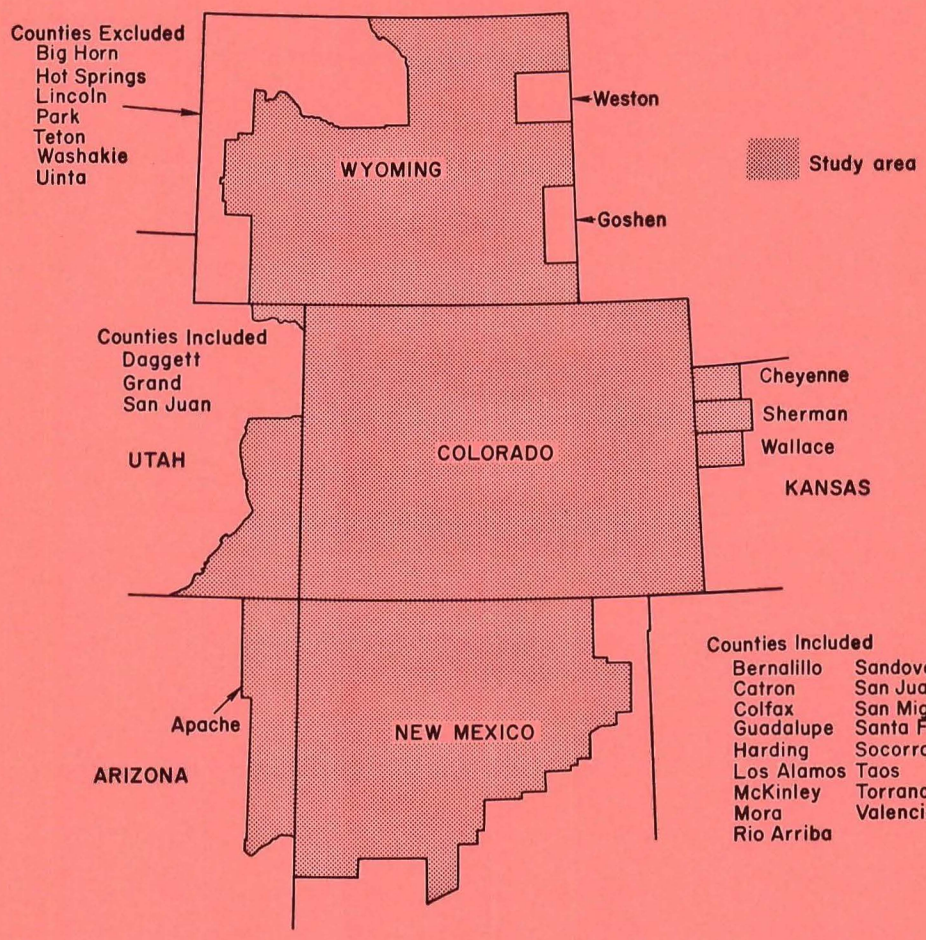
Sincerely yours,

Raymond Price

RAYMOND PRICE
Director

Enclosure

DENVER PLYWOOD MARKET STUDY AREA



INSTRUCTIONS

Plywood to report

Report only for the establishment shown in the address. (If there is more than one establishment in your firm, each will be asked to report separately.)

Include only the amounts of plywood used by you or your employees in the Study Area. (Refer to map above for Study Area boundaries.)

Do not report plywood used by subcontractors who worked for you, plywood used in manufactured components you bought, or plywood used outside the Study Area.

Plywood volume

Reporting plywood volumes in square feet of surface area is preferable, but provision is made to report number of sheets.

If sheets are the unit used, please give the length and width in feet; for example, 4 x 8, 4 x 9, 3 x 6, etc. To convert number of sheets to square feet, multiply the surface area by the number of sheets. Example: A 4 x 8 sheet has 32 square feet of surface area; therefore, ten 4 x 8 sheets (32 square feet) = 320 square feet of plywood.

Softwood and hardwood classification

The species of the face veneer determines the classification of the plywood. (For example, if the face veneer is a hardwood, classify the plywood as "hardwood plywood" regardless of what species is used for the back veneer or inner plies.)

Classify plywood as "softwood" if it is faced with a "medium density," "high density," or non wood-grain pattern "high pressure" overlay.

Classify the plywood according to the species represented by the overlay if it is faced with a wood-grain printed overlay.

1. DURING 1968, APPROXIMATELY HOW MUCH PLYWOOD WAS USED BY THIS ESTABLISHMENT IN THE STUDY AREA FOR ALL PURPOSES?

> If you used no plywood in the Study Area, check None below and return this questionnaire in the enclosed self-addressed envelope.

☐ None

Total softwood plywood used:

Square feet surface measure _____
or

	Number	*Size*
Sheets	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____

Total hardwood plywood used:

Square feet surface measure _____
or

	Number	*Size*
Sheets	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____

Approximately what percent of plywood reported above was used for each of the following purposes?

	Softwood (Percent of total)	*Hardwood*
Single family houses - on-site construction, remodeling, repair	_____%	_____%
Garden apartments (4 stories or less) construction, remodeling, repair	_____%	_____%
High-rise apartments (5 stories or more) - construction, remodeling, repair	_____%	_____%
Nonresidential buildings - on-site construction, remodeling, repair	_____%	_____%
Construction other than buildings	_____%	_____%
Manufactured homes and buildings	_____%	_____%
Mobile homes	_____%	_____%
TOTAL	100%	100%

2. DURING 1968, APPROXIMATELY HOW MUCH PLYWOOD WAS USED BY THIS ESTABLISHMENT IN THE STUDY AREA FOR GENERAL MANUFACTURING OPERATIONS (MANUFACTURING OTHER THAN MANUFACTURED HOMES OR BUILDINGS AND MOBILE HOMES)?

> If you used no plywood for general manufacturing operations in the Study Area, check None below and return this questionnaire in the enclosed self-addressed envelope.

☐ None

Total softwood plywood used for general manufacturing operations:

Square feet surface measure _____

or

	Number	*Size*
Sheets	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____

Total hardwood plywood used for general manufacturing operations:

Square feet surface measure _____

or

	Number	*Size*
Sheets	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____
	_____	_____ x _____

3. APPROXIMATELY WHAT PERCENT OF THE SOFTWOOD AND HARDWOOD PLYWOOD USED FOR GENERAL MANUFACTURING OPERATIONS IN 1968 WAS OF EACH THICKNESS LISTED BELOW?

Thickness	*Softwood (Percent of total)*	*Hardwood (Percent of total)*
3/16"	_____%	_____%
1/4"	_____%	_____%
5/16"	_____%	_____%
3/8"	_____%	_____%
1/2"	_____%	_____%
5/8"	_____%	_____%
3/4"	_____%	_____%
Other (specify)		
_____	_____%	_____%
_____	_____%	_____%
TOTAL	100%	100%

4. APPROXIMATELY WHAT PERCENT OF THE SOFTWOOD AND HARDWOOD PLYWOOD USED FOR GENERAL MANUFACTURING OPERATIONS IN 1968 WAS OBTAINED DIRECTLY FROM EACH OF THE SOURCES LISTED BELOW?

Source	*Softwood (Percent of total)*	*Hardwood (Percent of total)*
Within Study Area:		
Mill	_____%	_____%
Wholesale dealer	_____%	_____%
Retail dealer	_____%	_____%
Importer	_____%	_____%
Other (specify)		
_____	_____%	_____%
Outside Study Area:		
Mill	_____%	_____%
Wholesale dealer	_____%	_____%
Retail dealer	_____%	_____%
Importer	_____%	_____%
Other (specify)		
_____	_____%	_____%
TOTAL	100%	100%

5. APPROXIMATELY WHAT PERCENT OF TOTAL SOFTWOOD PLYWOOD YOUR ESTABLISHMENT USED FOR ITS MANUFACTURING OPERATIONS IN 1968 WAS USED IN THE APPLICATIONS LISTED BELOW? WHAT THICKNESS AND SPECIES DID YOU USE MOST OFTEN FOR EACH PURPOSE?

Application	*Percent of total softwood used*	*Thickness most often used (inches)*	*Species most often used*
Products made for sale	%	"	
Items you made for use in manufacturing or shipping your products.	%	"	
Maintenance and repair of your facilities	%	"	
Other (specify)	%	"	
TOTAL	100%		

6. APPROXIMATELY WHAT PERCENT OF THE TOTAL HARDWOOD PLYWOOD YOUR ESTABLISHMENT USED FOR ITS MANUFACTURING OPERATIONS IN 1968 WAS USED IN THE APPLICATIONS LISTED BELOW? WHAT THICKNESS AND SPECIES DID YOU USE MOST OFTEN FOR EACH PURPOSE?

Application	*Percent of total hardwood used*	*Thickness most often used (inches)*	*Species most often used*
Products made for sale	%	"	
Items you made for use in manufacturing or shipping your products	%	"	
Maintenance and repair of your facilities	%	"	
Other (specify)	%	"	
TOTAL	100%		

7. IN THE APPLICATIONS LISTED BELOW, APPROXIMATELY WHAT PERCENT OF THE TOTAL SQUARE FEET OF MATERIAL USED IN 1968 WAS PLYWOOD? WHAT MATERIALS OTHER THAN PLYWOOD WERE USED IN THESE SAME APPLICATIONS?

Application	*Plywood as percent of total material used in each application*	*Material used other than plywood*	
		Most often used	*Next most often used*
Products made for sale	_____%	_____	_____
Items you made for use in manufacturing or shipping your products	_____%	_____	_____
Maintenance of your facilities	_____%	_____	_____
Other (specify) _____	_____%	_____	_____

8. WHAT TYPE OF PRODUCT MANUFACTURED IN THE STUDY AREA BY YOUR ESTABLISHMENT CONSTITUTED THE LARGEST VALUE, SECOND LARGEST VALUE, AND THIRD LARGEST VALUE OF YOUR OUTPUT IN 1968 (E.G., MACHINERY, HOUSEHOLD FURNITURE, SPORTING GOODS, TOYS, ETC.)? APPROXIMATELY WHAT PERCENT OF TOTAL SALES DID EACH TYPE OF PRODUCT ACCOUNT FOR?

List in order of importance:	*Percent of total sales*
(1) _____	_____%
(2) _____	_____%
(3) _____	_____%

Reported by _____ Date _____
(Name) (Title)

Telephone No. _____

GPO 848-566-6